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ABSTRACT

The Career Education Needs Information System (CENIS) is a data collection analysis, and reporting system designed to provide for most technical occupations current and projected personnel needs of employers in Iowa, incoming student preferences, expected supply of graduates, and outcomes of area school graduates during the latest three year period. The manual describes operating procedures for CENIS. The manual's major sections correspond to major components in the computer software package: CENIS computer software supervisor, labor demand, student interest, three year followup, and CENIS interface. The software supervisor determines which program of those in the program library the user wishes to execute, passes information to that program, and lets the program perform its task. The chapter on the supervisor discusses program structure and operation, the utility program, job control language, and the program library. The CENIS interface component summarizes all component data to give a concise report of the needs in career education across the State. The chapter on interface, as well as those on labor demand, student interest, and three year student followup, cover required data collection and editing procedures, the characteristics and use of CENIS computer software, and the form and content of reports generated by the computer. (JR)

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MANUAL OF

CENIS

OPERATING PROCEDURES

AND

COMPUTER SOFTWARE

Produced for the

IOWA STATE DEPARTMENT OF PUBLIC INSTRUCTION

by

The Statistical Numerical Analysis and Survey
Sampling Sections of the Statistical Laboratory

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Ames, Iowa

1974

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Preface

The Career Education Needs Information System (CENIS) was developed in a cooperative effort by the Iowa State Department of Public Instruction (DPI) and two sections of the Statistical Laboratory at Iowa State University (ISU). The specifications, design, implementation and first analysis were carried out during a two and one-half year period which encompassed the years 1972-1974.

System specifications, and many elements of the design, were developed by Dr. W. O. Schuermann, Dr. Kenneth Wold, George Lawrey, Donald Wederquist, David McWethy and others, all members of the Career Education Division of the State Department of Public Instruction. Much of the remaining work was done at Iowa State University under contract to DPI.

The survey sampling design for the labor demand component data collection portion of CENIS was developed by the Survey Sampling Section of the Statistical Laboratory at ISU. Data collection operations, in the first labor demand analysis, were closely monitored by this section. Dr. Roy Hickman and Harold Baker supervised these operations. The description of the sample survey design, which is contained in this manual, was written by Professor Baker.

The CENIS computer system design and implementation, and the data processing activities involved in the first CENIS analysis, were carried out by the Statistical Numerical Analysis and Data Processing Section of the Statistical Laboratory at ISU. This manual was, except as mentioned above, written by members of this section. Persons from the section who made major contributions to the project include Dr. W. J. Kennedy, Bud

Meador, James zumBrunnen, Gary McCormick, Charlotte Bentley, Mary Remsburg, Carol Dunn and Diane Chien. The efforts of Gary McCormick and James zumBrunnen deserve special acknowledgement. These two men developed the CENIS software supervisor, which is a key component in CENIS. The excellent work of Carol Dunn, who typed this entire manual, also deserves special mention.

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CHAPTER 1 INTRODUCTION TO CENIS

The Career Education Needs Information System (CENIS) is a data collection, analysis and reporting system. The system is designed to provide, for most of the technical type occupations, current and projected personnel needs of employers in Iowa, incoming student occupational preferences, expected supply of graduates, and outcomes of area school graduates during the latest three year period. These data, produced from CENIS, give an overview of the current and projected technical education needs in Iowa based on the expected needs of employers and the experiences of graduates from past years.

The overall system is best described as being comprised of five components. These components are the following:

1) CENIS Computer Software Supervisor
2) Labor Demand
3) Student Interest
4) Three Year Followup
5) CENIS Interface

The CENIS Interface component is the one which features summarization of all component data to give a concise report of the needs in career education across the state.

Design and implementation of CENIS was started in 1972. One complete set of CENIS data was processed in 1973, using individual preliminary component computer software packages. This first CENIS analysis produced more than 300 different output reports, based on several tens of thousands of input records. This initial implementation of CENIS certified the

validity and utility of the basic design, and work began on an integrated CENIS Computer Software Package during 1974. The entire project was completed in August, 1974.

This manual is designed to provide details of operating procedures for CENIS. These include required data collection and editing procedures, the characteristics and use of CENIS computer software, and the form and content of reports generated by the computer. Major sections in this manual correspond, for the most part, to major components in the computer software package.

CHAPTER 2

CENIS SUPERVISOR

2.1 Introduction to the CENIS Computer Software Supervisor

The CENIS operating system consists of a program library in the form of IBM load modules. Each program in the system is a member in this load module. One of the programs in the library is a supervisory program named CENIS. The primary purpose of this chapter is to describe CENIS and its relationship to other programs in the system. An explanation of general purpose maintenance considerations will also be given along with required procedures in system generation.

To simplify explanation, the term segment will refer to one of the four major divisions of the system:

1) Student Followup
2) Student Interest
3) Labor Demand
4) Interface

The term <u>routine</u> will apply to an individual program within one of the segments.

The purpose of the supervisor is to determine which program the user wishes to execute, obtain the program from the library, pass certain information to this program, and then let the program perform its task. When the program finishes its task it will pass control back to the supervisor which will then determine whether the user desires that another program be executed. When the selected program has completed its task, it is removed from core by the supervisor. An operating system of this type allows the execution of many routines while it keeps the amount of core required to a minimum. The loading and unloading of modules—known as an overlay—is done directly in the supervisor rather than through the linkage editor because it

is easier to implement and also makes future system alteration much easier. With this general structure in mind the CENIS system can now be explained in greater detail.

2.2 Supervisor Structure and Operation

2.2.1 General Program Operation

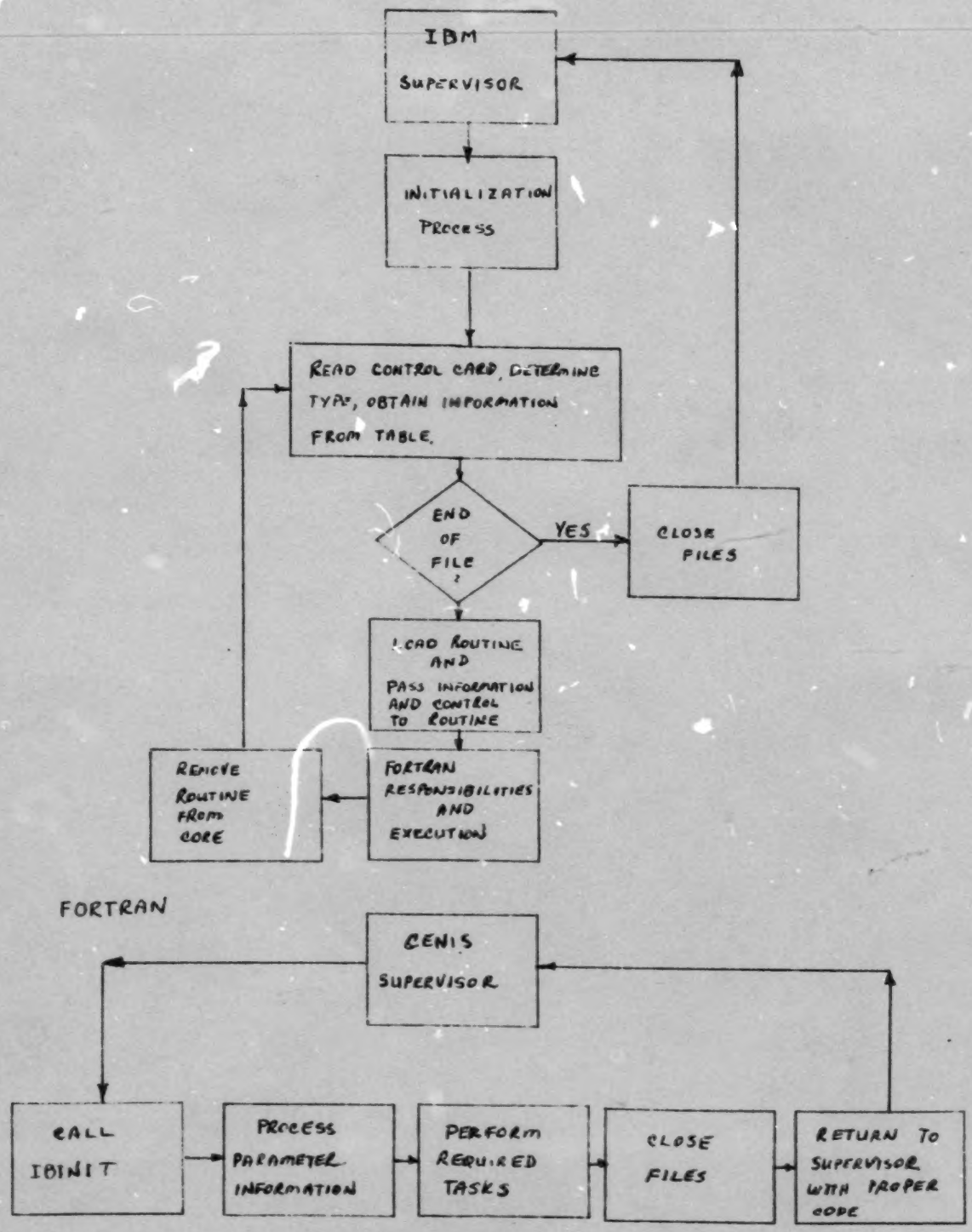
The supervisor is passed control from the system (IBM) monitor. Upon first obtaining control the supervisor performs two basic functions, 1) obtains date information from IBM system, 2) opens files necessary for its execution. The supervisor then is ready to determine what the user desires to do by reading in a control card. After determining which type of control card has been read, the program will then search through a table to determine whether the card is valid and, if it is, will proceed to obtain the information from the table. (The actual forms of the control cards and table will be discussed in later sections.) From the information in this table the supervisor obtains the name of the routine in the program library. At this point the supervisor loads the program into core and passes control, along with three parameters, to the program.

The responsibilities of this loaded program will now be discussed. Except for the general utility routines, all routines are FORTRAN subroutines. The FORTRAN routines will have as their first statement

```
SUBROUTINE    XXXXXX(IN,IOUT,DATE)
```

where XXXXXX is the routine name, IN is an INTEGER*4 array of length 10 of FORTRAN input unit numbers pointing to the files needed by the routine, IOUT is an INTEGER*4 array of 10 output units needed by the routine, and DATE is an array of length three (12 byte string) of the character form of the date. It is the routine's responsibility to dimension these variables and to use them to perform their obvious functions. The first operation that the routine should then perform is to call a subroutine IBINIT which

Figure 2.1 CENIS Supervisor in Operation



initializes the FORTRAN error handling routine IBCOM//. The routine is then free to perform its required tasks. Upon completion of these tasks the routine must call a FORTRAN subroutine CLOSEF with parameters IN and IOUT. This routine closes any FORTRAN files used by the routine and frees the buffer space required by these units. The program must then return control to the supervisor. This statement has the form:

STOP - program executed as expected

STOP 1 - program could not execute as expected.

At this point the control is passed back to the supervisor which in turn removes the routine from core to allow room for the next routine. At this point the supervisor is ready to determine what the user wants next by reading another control card. This logic can be seen in symbolic form in Figure 2.1. A more detailed description of the supervisor operations may be obtained by reading the comments in the supervisor (CENIS) source listing. In this general description we have referred to control cards and a table of information in the supervisor. These will now be described in greater depth.

2.2.2 Control Card Usage

The control cards used by the system are standard 80 column cards. To simplify our explanation the following fields are defined on the cards:

Col. 1-15	segment name field
Col. 16-30	operation field
Col. 31-80	operand field

2.2.2.1 Control Cards From the User's Standpoint

The user communicates with the system by placing the correct entries in the segment field or in the operation and operand fields. In general, the user punches one card with his choice of an entry in the segment field and then follows it with one or more cards with entries in the operation and operand fields to indicate which routines he desires to execute.

The entry in the segment field must be one of the following values:

STUDENT FOLLOWUP

STUDENT INTEREST

LABOR DEMAND

INTERFACE

These entries <u>must</u> begin in column one and be spelled properly. In the case where the entry consists of two words, these two words must be separated by only one blank. When the user specifies an entry beginning in the segment field the remainder of the card should remain blank.

The entries in the operation and operand fields appear in pairs on this type of control card. The value in the operation field must be one of the following values:

EXECUTE

SCRATCH

LIST

DATE.

This entry must begin in column 16 and be followed by blanks until the operand entry appears. The operand entry is dependent upon the operation field entry and the routine that user desires to execute in the segment he has indicated. The operation entries following an operand of SCRATCH,

LIST, and DATE are of a fixed format and will be explained in the section where these utility programs are documented. The operation entry following the EXECUTE operand is dependent upon the particular routine the user wishes to run in that segment. Typical operands might be:

REPORT ONE

DATA FILE

SORT DATA

INTERFACE FILE.

Again, the first character of the operand entry must appear in Column 31 of the control card. If the operand entry consists of more than one word, the words must be separated by only one blank.

The segment cards and operand-operation cards may appear in any order the user deems logical. The only exception to this is that the first card in the control deck must be a segment field card. For example, a user could run a routine in the LABOR DEMAND segment followed by two routines in STUDENT FOLLOWUP segment and then return to the LABOR DEMAND segment to execute another of its routines. This is illustrated in Figure 2.2.

Figure 2.2 Control Language Usage Across Components

```
LABOR DEMAND
            EXECUTE        REPORT ONE
STUDENT FOLLOWUP
            EXECUTE        LABEL FILE
            EXECUTE        REPORT ONE
LABOR DEMAND
            EXECUTE        REPORT THREE
```

The specific operand entries, and the associated routines which they specify, will be given in the documentation section for the segment in which the routines appear. Also appearing in that section will be the logical order in which the routines should be run in order that each program will have the files it requires to execute properly. This order of execution should be apparent when the table area located in the supervisor is explained.

2.2.2.2 Control Card Usage Within the Supervisor

The basic function of the supervisor is to read a control card and to establish whether it is a segment or operation-operand card. Upon establishing the type, the supervisor has certain tasks to perform in each case. The details of determining the type can be seen in the supervisor source listing.

2.2.2.2.1 Segment Type Card

When the supervisor has determined that the card is of this type it then determines which of four segment names appears in the segment field of the card. With this established, it then sets two variables to values which are unique to that segment. These two variables relate to the table in the supervisor. The first variable points to the position in the table at which routines for this particular segment begin to occur. The second variable has a value equal to the number of routines in that particular segment. These variables will be used when the supervisor encounters a following operation-operand card. Once these two variables have taken on values, these values do not change until another segment type card is encountered. A detailed account of this proceeding may be seen in the

supervisor's source listing comments.

2.2.2.2.2 Operation-Operand Card

After the supervisor has decided it has encountered an operation-operand card it must then decide which routine the user wishes to use. The supervisor first decides whether the card asks for one of the utility routines—LIST, SCRATCH, or DATE—or whether the user is asking for a particular routine in the segment. In the case of the former the supervisor simply passes control to the requested utility. For the latter, the supervisor begins a table search, using the two variables mentioned in the previous section, to determine where to begin and stop searching in the supervisor table. When the proper element is found in the table, the supervisor can then use the information in the table to load and execute the requested routine. A more detailed view of these operations can be obtained through comments in the supervisor source listing.

2.2.3 Table Description of CENIS Supervisor

The table section of the supervisor contains information needed by the supervisor to determine which routine the user desires to run. Once it has decided which routine is to be run, the supervisor obtains the FORTRAN name of the routine from the table and the parameters which must be passed to the routine to allow it to execute properly. Included also is a feature which allows the supervisor to determine whether a previously run routine's error could cause the routine requested to fail in its operation. The table is divided into four sections—one section for each

segment. The table sections for INTERFACE, STUDENT FOLLOWUP, and STUDENT INTEREST allow for sixteen possible routines to be entered in the table. The last section in the table, LABOR DEMAND, already has exactly sixteen routines and the table may be lengthened, as required, to accomodate any additional routines placed in this segment. Each routine within a segment has an associated 204 byte element in the table.

Before discussing the specifics of a table element, the manner in which each routine in the table is assigned a routine number will be defined. Each routine is assigned a two-digit number of the form

sd

where s may take on the values 0,1,2,3,4 and where d may take on the values 1-9,A-F,0. The value of s refers to the segment that contains the routine. The correspondence between s value and segment is:

0 - Student Followup

1 - Interface

2 - Student Interest

3,4 - Labor Demand.

The value of d is the number of the routine in the segment. It is in the hexadecimal number system and consequently can take on the values A-F (11-15). The order in which the segment sections are placed in the table is sequential with respect to the value of s, in the number sd, for a particular segment.

As was mentioned previously, each routine has a table element of length 204 bytes. The format of this element is as follows:

Bytes

1) 1-43 - operation-operand field entries which appear on the control card when this routine is requested.

2) 44-49 - FORTRAN named routine that is stored in the disk program library.

3) 50-124 - 75 byte string of routine numbers which the supervisor should check for possible execution errors before the routine is executed.

4) 125-164 - array of ten Integer*4 input units that the routine will use during execution.

5) 165-204 - array of ten Integer*4 output units that the routine will use during execution.

The use of Items 1), 2), 4), and 5) has been noted in previous sections. It should be noted that the 75 byte strings in Item 3 of the documentation of the routines to be checked for improper execution pertain <u>only</u> to <u>this</u> run of the supervisor. If a routine had failed to execute properly on a previous computer run, it would be the user's responsibility to note this.

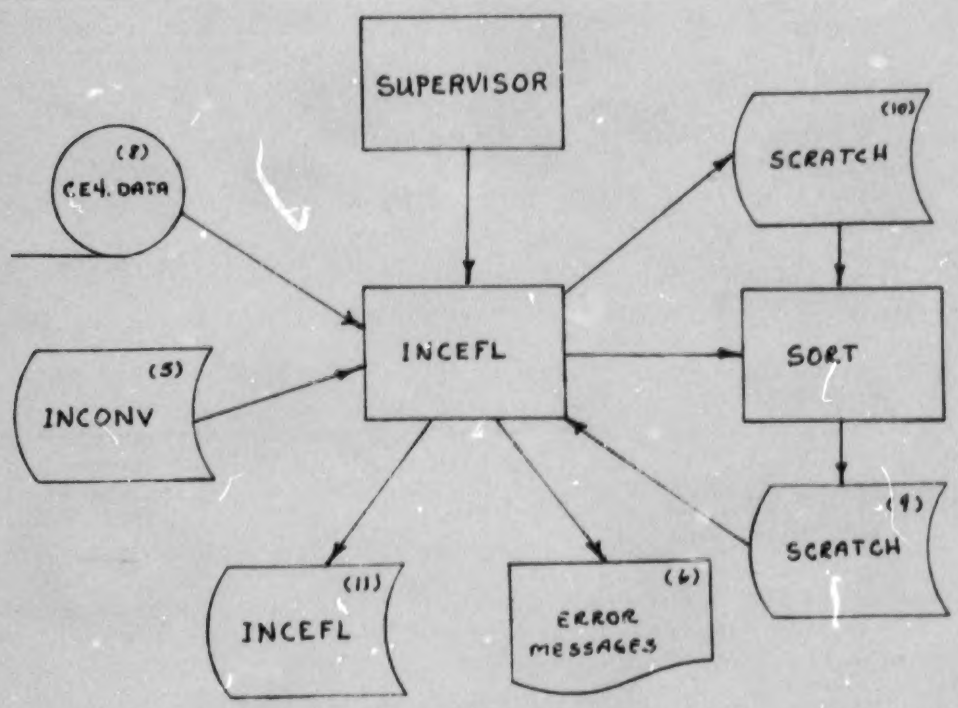
The supervisor performs this check by keeping a current table of flags which is updated after execution of any routine in a run. If a routine does not execute properly, the flag corresponding to that routine is set. If one of the following routines requested to be executed has the program in error as one of its routines to be checked prior to execution, the flag set in the current table of flags will be noted and the following routine would not be allowed to execute. The detailed logic of how this checking and setting of flags is performed can be seen in the supervisor program source comments.

These table entries are directly related to the routine flowcharts provided with each segment. A listing of the table elements in the supervisor is given in the Supervisor Source listing. The tables are written in IBM Assembler Language; however, due to the fact that they consist of only character and numerical value definition, the actual Assembler instruction does not need to be understood by the user to follow what is happening.

Figure 2.3 gives a typical table entry with its associated input-output flowchart. The routine flowchart shall be examined first. One can see that the FORTRAN routine INCEFL number 13 (third program in the INTERFACE segment) uses FORTRAN units (8), (5) as input units and (9), (10), (11), (6) as output units. Units (9) and (10) are used as intermediate storage areas by this program. Upon examining the table entries, one sees many of the same items and numbers appearing in the input-output flowchart. In particular, the first line contains the operation-operand entry to be found in a control card, the second line contains the FORTRAN name of the routine, the fourth line contains the input units used by the program, and the fifth line contains the unit numbers of the output files. Since the program required only two input and four output units, the constants 8F'0' and 6F'0' zero out the remaining units in the ten element arrays of input and output units, respectively. The third line of the table indicates that the flags for routine number 11 should be checked in the current flag table for proper execution. In this case, this is program 1 in the Interface segment and it created file (5). Its flag was checked since routine 13 would not be able to execute properly if file (5) had not been created properly. If the routine to check has a value of '00', no check is performed.

Figure 2.3 Typical Table Entry Flow

EXECUTE CAREER EDUCATION FILE




```
DC      CL43'EXECUTE    CAREER EDUCATION FILE'
DC      CL6'INCEFL'
DC      XL75'11'
DC      F'8,5', 8F'0'
DC      F'9,10,11,06', 6F'0'
```

This relationship remains consistent throughout table entries and input-output flowcharts except in the utility routine CDTODK. This discrepancy will be explained in the section where this routine is documented.

2.2.4 Output From CENIS Supervisor

The Supervisor creates an output print data set which contains a listing of the control cards processed by the supervisor. The control cards are printed in exactly the same manner in which they were punched. Intermixed with the listing of the control cards will be error messages whenever the supervisor determines that an error has occurred. In general, these messages will point out that the user has either mispelled or misplaced a segment, operation, or operand field on the control card. A message will also be printed if a routine indicates to the supervisor that it has not executed properly.

The supervisor printed output is located on FORTRAN unit 6 (FT06F001). The supervisor prints a control card on this unit as soon as it is input. If the control card is not in error, the supervisor then begins the procedure to determine which routine to execute. While this routine is executing it can also print messages on unit 6 to indicate any abnormal occurrences in its execution. These messages will then follow the listing of the control card, which asked for the routine to be run, on the supervisor output listing. FORTRAN unit 6 is also the data set upon which the FORTRAN execution time error messages are printed. Consequently any errors of this type will also be listed following the listing of the control card.

Certain types of errors will cause the supervisor to discontinue its processing of control cards. When this type of an error occurs, the

Figure 2.4 Supervisor Output From Proper Execution

```
*** CONTROL LANGUAGE OUTPUT FROM CENIS SUPERVISOR

STUDENT FOLLOWUP

                EXECUTE     DATA FILE

                EXECUTE     LABEL FILE

                EXECUTE     REPORT ONE

                EXECUTE     INTERFACE FILE

*** SUPERVISOR HAS PROCESSED ALL CONTROL CARDS FOR THIS RUN
```

Figure 2.5 Supervisor Output From Spelling Error

```
*** CONTROL LANGUAGE OUTPUT FROM CENIS SUPERVISOR

INTERFACE

        EXECUTE     LABEL   FIEL

        *** ERROR--ROUTINE NAME NOT RECOGNIZED

*** CHECK PROPER SPELLING AND POSITIONING OF COMMANDS ON CARDS
*** AN ERROR HAS OCCURRED--THE FOLLOWING WERE NOT EXECUTED

        EXECUTE     REPORT ONE

        EXECUTE     REPORT TWO

*** SUPERVISOR HAS PROCESSED ALL CONTROL CARDS
```

supervisor will print out a message indicating this fact and then list the remainder of the cards that it has not processed. The user can then check these cards for possible spelling and positioning errors. It should be noted that the supervisor does not check these remaining cards for errors, it merely lists them for inspection.

Two types of errors can cause the supervisor to stop processing control cards:

1) Misspelling or incorrect positioning of the words in the various control fields on the cards.
2) Request for the execution of a routine whose execution depends on a routine that did not run properly.

Figures 2.4, 2.5, and 2.6 are examples of various types of output from the CENIS Supervisor. Figure 2.4 shows proper execution. Figure 2.5 shows an error in spelling and positioning. Figure 2.6 gives an example of error output from a requested routine. This routine indicated that it did not execute properly and, consequently, the next routine, whose execution depended on the first, was not run.

Another type of output, which will be printed, will be noted in this section although it is not directly related to the supervisor. This is the output from the IBM Sort routine which is shown in Figure 2.7. The user should consult the IBM documentation of this routine for further explanation. If more than one requested routine performs a sort, the output from the sort program will be listed sequentially in the order in which the sorts were executed.

Figure 2.6 Error Output from Routine

```
*** CONTROL LANGUAGE OUTPUT FROM CENIS SUPERVISOR

STUDENT FOLLOWUP

                EXECUTE        DATA FILE

 NO DATA FOUND ON UNIT 1

 NO DATA WRITTEN ON UNIT 2
                *** WARNING -- THIS ROUTINE DID NOT EXECUTE

                EXECUTE        REPORT ONE

                *** ERROR -- ROUTINE NOT RUN DUE TO RETURN CODE

*** NOTE -- FOR ALL ERRORS CHECK PROPER SPELLING AND POSITIONING OF
            COMMANDS ON CONTROL CARDS

*** AN ERROR HAS OCCURRED -- THE FOLLOWING WERE NOT EXECUTED

                EXECUTE        REPORT TWO

                EXECUTE        INTERFACE FILE

*** SUPERVISOR HAS PROCESSED ALL CONTROL CARDS
```

Figure 2.7 Typical Output from Sort

```
IER036I - B =  35
IER037I - G =  217
IER038I - NMAX =  47869
IER045I - END SORT PH
IER049I - SKIP MERGE PH
IER055I - INSERT   26223,DELETE  26223
IER054I - RCD IN        ,OUT
IER052I - EOJ
```

2.3 Utility Program Explanations

2.3.1 Change Of Date Program

This routine allows the user to change the date on various reports generated by the system. The routine is internal to the supervisor and is not in the disk library. If this routine is not executed, the data obtained from the IBM system will be used on the reports. It should be noted that once the routine is executed, the date specified to the date routine remains in effect until another DATE card is encountered. Once the DATE routine is executed the user cannot obtain the IBM system date again in that particular run. The DATE routine may be executed within any segment. The date routine is run by placing DATE in the operation field and up to a twelve-column date beginning in the operand field. An example might be:

```
INTERFACE
          DATE          JULY 12, 1974
```

2.3.2 Program to List a Data Set

The List program is used to list a data set on paper. This might be done in order to determine that the data in the data set is in the proper form, or it might be used to locate possible errors in the data set. This is in the program library on disk and is loaded into core when requested by the user. The listing of the data set is placed on FORTRAN unit 32 (FT32F001). This program may be used to list records of up to 240 bytes per record with the first line of each record numbered with the position that record occupies in the file. If the length of the record is greater than 80 bytes, the list routine places 80 bytes of the record

per printed line for as many lines as are required. The list routine may be requested by the user in any of the four segments. The user requests the list routine by punching LIST in the operation field and the DDNAME of the data set to be listed in operation field. An example might be:

```
STUDENT FOLLOWUP
                    LIST        FT04F001
```

An example of LIST output is given in Figure 2.8.

2.3.3 Utility Routine to Scratch Data Set

The Scratch routine may be used to scratch a data set from a disk file, and free its space for use by another data set. This routine could be used to scratch data sets not required by the system. Possible candidates to scratch might be temporary or practice data sets no longer required. Another possibility might be to use the program to remove previous years' data from the disk to make room for the next year's data. The scratch routine is located internal to the supervisor. This routine may be used only to scratch data sets from IBM 2314 disk packs. This default may be changed by consulting the supervisor source listing comments. The scratch routine may be executed in any of the four segments. The user may request that a data set be scratched by placing SCRATCH in the operation field and the following entry in the operand field:

```
XXXXXX DATA SET ZZZZZ...
```

where XXXXXX is the serial number of the disk pack and ZZZZZ... is the Data Set Name (DSN) of the data set to be scratched. An example might be:

```
LABOR DEMAND
                    SCRATCH     CENIS1 DATA SET LDLBFL
```

Figure 2.8 Output from List Routine

```
LIST OF RECORDS ON FT01F001

RECORD NO.     RECORD IMAGE

     1         1111111 222222 33333
     2         111111111111   2222
     3         1111111 222222 33333
     4         888888888   555555 2
     5         1111111 222222 33333

ALL RECORDS ON THIS FILE HAVE BEEN LISTED
```

Figure 2.9 Typical Table Entry for CDTODK

```
DC     CL43'EXECUTE          LABEL FILE'
DC     CL6'CDTODK'
DC     XL75'00'
DC     C'CD51F001',8F'0'
DC     C'FT03F001',F'6',7F'0'
```

2.3.4 Utility Routine CDTODK

This routine is used to copy a card data set onto disk. It is used by routines in each of the four segments, and is documented here to avoid duplication. This program is located in the program library and is executed when the user requests a routine which requires the copying of cards to disk. It is generally used to copy a card file of labels onto disk. When the routine is loaded into core for execution it is passed an input and output DDNAME, and a FORTRAN unit upon which it can write its errors. The routines requiring CDTODK obtain this information from the routines' entry in the supervisor table.

The discrepancy mentioned previously between certain table elements can now be explained. The difference occurs in the input and output unit number portion of the table entry. For the CDTODK the first two Integer*4 elements in the input-output arrays contain the character representation of the input and output DDNAMES respectively. Figure 2.9 shows the table entry for a routine requesting the CDTODK program. This figure can be compared with a standard table element to see where the above mentioned discrepancies occur.

Since the CDTODK routine is written in BAL, it doesn't require the standard FORTRAN (FT) units to execute. Consequently, the convention has been adopted to prefix these card files for CDTODK with 'CD' rather than 'FT' in order to conserve FORTRAN units, and to use them only when a particular data set is required to be read by a FORTRAN program.

2.4 Job Control Language for Execution of CENIS

In this section the JCL required to execute the CENIS system will be described. This job control language is in the form of two IBM JCL PROC's. Within each of these Procs is an EXEC statement which causes the system supervisor to pass control to the CENIS supervisor. The remaining statements in the PROC are DD statements. The majority of these statements are FORTRAN DD statements. These unit numbers, and their respective data statements, are documented in the section in which the routines that use these files are explained. The above would include any DD statements of the form CDXXF001 or FTXXF001. The remaining statements will be explained in this section.

The STEPLIB DD statement refers to the data set upon which the library of CENIS programs reside. The SORTLIB DD statement refers to the data set upon which the IBM sort program is located. The SYSOUT DD refers to the data set upon which the sort program can place its output. The SORTWK01 through SORTWK06 refer to data sets which the sort program uses as intermediate storage areas during its sort operation.

Figures 2.10 and 2.11 illustrate the two Procs used to execute the CENIS system. These Procs are named CENIS1 and CENIS2. Two Procs had to be used for the system due to the fact that the CENIS routines required more than the limit of 32 FT units allowed by FORTRAN. The Proc CENIS1 can be used for the LABOR DEMAND, STUDENT FOLLOWUP, and INTERFACE segments. The Proc CENIS2 can be used for the STUDENT INTEREST, STUDENT FOLLOWUP, and INTERFACE segments. Consequently the STUDENT INTEREST and LABOR DEMAND segments may not be executed in the same step.

To execute the CENIS system the user inserts the following statements

Figure 2.10 CENIS1 Catalogued Procedure

```
//CENIS1 PROC  CP=OLD
//CENIS  EXEC  PGM=CENIS,REGION=128K,TIME=1
//STEPLIB  DD  DSN=CENIS.PROGRAMS,DISP=SHR,UNIT=2314,VOL=SER=CENIS1
//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK02    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK03    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK04    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK05    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK06    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SYSOUT DD SYSOUT=A
//FT01F001 DD DUMMY        STUDENT FOLLOWUP DATA CARDS
//FT02F001 DD  DSN=SFDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT03F001 DD  DSN=SFLFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT04F001 DD DSN=SFINFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT06F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=133)
//FT07F001 DD  DSN=INCONV,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT08F001    DD DSN=CE4.DATA,DISP=(OLD,PASS),UNIT=TAPE,
//  VOL=SER=CENIS,LABEL=(1,SL)
//FT09F001 DD  DSN=&&SCR01,UNIT=SCRTCH,DISP=(NEW,PASS),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT10F001 DD  DSN=&&SCR02,UNIT=SCRTCH,DISP=(NEW,PASS),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT11F001 DD  DSN=INCEFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT12F001 DD  DSN=INMDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT13F001 DD  DSN=INPSFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT14F001 DD   DSN=INDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT15F001 DD   DSN=INLFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//       SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT18F001 DD  DSN=LDWTFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//       SPACE=(TRK,(500,50),RLSE),
//       DCB=(RECFM=FB,LRECL=100,BLKSIZE=3200,BUFNO=1)
//FT19F001 DD  DSN=&&SCR03,UNIT=SCRTCH,DISP=(NEW,PASS),
//       SPACE=(TRK,(500,75),RLSE),
//       DCB=(RECFM=FB,LRECL=100,BLKSIZE=3200,BUFNO=1)
//FT20F001 DD  DSN=LDDEFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//       SPACE=(TRK,(500,50),RLSE),
//       DCB=(RECFM=FB,LRECL=100,BLKSIZE=3200,BUFNO=1)
//FT21F001 DD  DSN=LDINFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//       SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT22F001 DD  DSN=LDLBFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//       SPACE=(TRK,(20,20),RLSE),
//       DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200,BUFNO=1)
//FT31F001 DD  DSN=SIINFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&OP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT32F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//CD51F001 DD  DUMMY    STUDENT FOLLOWUP  -  LABELS
//CD53F001 DD  DUMMY     INTERFACE  -  TAXONOMY CONVERSIONS
//CD54F001 DD  DUMMY     INTERFACE  -  MDTA DATA
//CD55F001 DD  DUMMY     INTERFACE  -  PRIVATE SCHOOL DATA
//CD56F001 DD  DUMMY     INTERFACE  -  LABELS
//CD57F001 DD  DUMMY    LABOR DEMAND  -  LABELS
// PEND
```

Figure 2.11 CENIS2 Catalogued Procedure

```
//CENIS2  PROC DP=OLD
//CENIS  EXEC  PGM=CENIS,REGION=128K,TIME=1
//STEPLIB  DD  DSN=CENIS.PROGRAMS,DISP=SHR,UNIT=2314,VOL=SER=CENIS1
//SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK02    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK03    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK04    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK05    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SORTWK06    DD UNIT=SCRTCH,SPACE=(TRK,(150,10),RLSE)
//SYSOUT DD SYSOUT=A
//FT01F001 DD DUMMY        STUDENT FOLLOWUP DATA CARDS
//FT02F001 DD  DSN=SFDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT03F001 DD  DSN=SFLFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT04F001 DD DSN=SFINFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//    SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT06F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=133)
//FT07F001 DD  DSN=INCONV,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT08F001     DD DSN=CE4.DATA,DISP=(OLD,PASS),UNIT=TAPE,
//  VOL=SER=CENIS,LABEL=(2,SL)
//FT09F001 DD  DSN=&&SCR01,UNIT=SCRTCH,DISP=(NEW,PASS),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT10F001 DD  DSN=&&SCR02,UNIT=SCRTCH,DISP=(NEW,PASS),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT11F001 DD  DSN=INCEFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT12F001 DD  DSN=INMDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT13F001 DD  DSN=INPSFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT14F001 DD   DSN=INDFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=160,BLKSIZE=3200)
//FT15F001 DD   DSN=INLFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//       SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT16F001 DD  DSN=SILBFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT17F001 DD  DSN=SISVFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=200,BLKSIZE=3200)
//FT18F001 DD  DUMMY      DATA FOR STUDT INT
//FT19F001 DD SYSOUT=B,DCB=(LRECL=80,BLKSIZE=80,RECFM=FB)
//FT20F001 DD  DSN=SISRTS,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=200,BLKSIZE=3200)
//FT22F001 DD  DUMMY      SCOUT DATA FOR STUDT INT
//FT23F001 DD  DSN=SIMRGD,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT24F001 DD  DSN=SISRTD,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT25F001 DD  DUMMY      CONTROL CARDS FOR STUDT INT REPORTS
//FT27F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//FT28F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//FT29F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//FT30F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//FT31F001 DD  DSN=SIINFL,UNIT=2314,VOL=SER=CENIS1,DISP=(&DP,KEEP),
//        SPACE=(TRK,(20,20),RLSE),DCB=(RECFM=FB,LRECL=080,BLKSIZE=3200)
//FT32F001 DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=931)
//CD51F001 DD  DUMMY    STUDENT FOLLOWUP  -  LABELS
//CD53F001 DD  DUMMY     INTERFACE  -  TAXONOMY CONVERSIONS
```

Figure 2.11 (Continued)

```
//CD54F001 DD  DUMMY    INTERFACE  -  MDTA DATA
//CD55F001 DD  DUMMY    INTERFACE  -  PRIVATE SCHOOL DATA
//CD56F001 DD  DUMMY    INTERFACE  -  LABELS
//CD58F001 DD  DUMMY    STUDENT INTEREST  -  LABELS
// PEND
```

in the system job control stream

```
//stepname EXEC {CENIS1 / CENIS2},TIME=n,REGION=rrrK
          :
      procedure dd overrides

//SYSIN DD *
      :
    CENIS control cards
/*
//
```

where n is estimated time in minutes required for the routines to run and rrr is the amount of core required for the routines to execute. An estimate of rrr may be obtained from the documentation of the individual routines which will be run in this particular. The defaults established in the Procs are TIME=1 and REGION=128K. Further explanation concerning the use of JCL may be obtained from an IBM manual on OS JCL. One particular rule worth noting here is the fact that any overrides to DD statements in the CENIS1 and CENIS2 must appear in the same order in which the DD statements appear in the Procs.

2.5 Creation and Maintenance of the CENIS Program Library

This section explains how routines were originally placed in the CENIS program library and how these routines may be altered if necessary. In this section the name of the data set on disk containing the CENIS routines is CENIS.PROGRAMS. The placing of routines into this library basically involves a compile step of the routine to be executed and then a linkage edit step to place the load module into the library. For the FORTRAN routines the JCL is as follows:

```
//S1 EXEC ASMFC
//ASM.SYSIN DD *

  Assembler routine IBINIT source deck

/*
//S2 EXEC FORTGCL
//FORT.SYSIN DD *
      SUBROUTINE   XXXXXX(IN,IOUT,DATE)

       remainder of FORTRAN source

/*
//LKED.SYSLMOD DD DSN=CENIS.PROGRAMS,UNIT=2314,
//      VOL=SER=CENIS1,SPACE=(TRK,(200,100)),
// DCB=(RECFM=FB,LRELC=80,BLKSIZE=3200),DISP=(OLD,KEEP)
//LKED.SYSIN DD *
    ENTRY XXXXXX
    NAME  XXXXXX
```

In this example XXXXXX is the FORTRAN name of the routine to be placed on disk. The SYSLMOD DD statement in the linkage edit step points to the data set, on the 2314 disk pack named CENIS1, in which the routine XXXXXX will be placed. The linkage editor control cards ENTRY and NAME give the linkage editor the entry point and name of the program that is being placed in the program library.

To place the routines written exclusively in BAL upon disk, the following JCL is required:

```
//S1 EXEC ASMFCL
//ASM.SYSIN DD *
XXXXXXXX  START  0
          :
    Remainder of assembler source deck
/*
//LKED.SYSLMOD DD DSN=CENIS.PROGRAMS,UNIT=2314,
// VOL=SER=CENIS1,SPACE=(TRK,(200,100)),
// DCB=(LRECL=80,BLKSIZE=3200,RECFM=FB),DISP=(OLD,KEEP)
//LKED.SYSIN DD *
   ENTRY XXXXXXXX
   NAME  XXXXXXXX
```

This set of JCL is nearly identical to that for the FORTRAN routines with the exception that the assembler routine may be given an 8 character name rather than the six letter name used in FORTRAN.

Making changes in a particular program only requires changing the source statements to their corrected form. The routine is then recompiled and link edited in the same manner in which the original routine was put in the program library. The only change occurs on the NAME linkage editor control card. This card is changed to the form:

```
NAME  XXXXXX(R)
or
NAME  XXXXXXXX(R)
```

for FORTRAN and BAL routines respectively. The (R) tells the linkage editor that the old routine with the same name on disk is to be replaced with the new version of the routine.

2.6 Addition of a Routine to the CENIS Library

To add a routine to the CENIS system the programmer must first make a decision on the following items:

1) Segment in which the routine will be used
2) Value to appear in the operation field on the control card opposite of the EXECUTE entry in the operand field
3) The name of the routine (6 characters)
4) Which of the other routines in the system the proper execution of this routine depends upon.

The programmer should then draw an input-output flowchart to establish which files will be needed by the routine. Once this has been completed the programmer can then create a new element to be added to the table by following the explanation given in Section 2.2.3. This new table entry should then be placed in the section of the table belonging to the segment in which the routine will run. The new element should be placed following the last entry in the table for its respective segment. The value on the card, which indicates the number of remaining positions in the table for that particular segment, should then be decreased by one. The only exception to this is LABOR DEMAND section of the table which has no limit to the number of routines that may be added.

The only remaining change in the supervisor which must be made is to add the value 1 to the current value of NUM1, NUM2, NUM3, or NUM4 depending upon whether the routine was added to the STUDENT FOLLOWUP, INTERFACE, STUDENT INTEREST, or LABOR DEMAND segments respectively. (These variables have the value of the current number of routines in their respective

segments.)

When these changes are completed the supervisor should be recompiled and replaced in the program library. The new routine can then be compiled and placed in the system using the same procedure as the one given for creating the program library in Section 2.4.

CHAPTER 3

CENIS LABOR DEMAND COMPONENT

3.1 Labor Demand - Data Collection and Entry

The first Labor Demand survey was conducted late in 1972 and projections for the years 1973, 1975, and 1977 were obtained from analysis of these data. All descriptions contained in this and succeeding sections will use these year numbers as a base of reference. This device facilitates and simplifies all descriptions. Obviously, future surveys will involve different year numbers, but the relative considerations with respect to time periods will be the same for these future labor demand surveys.

This chapter is divided into four sections to facilitate the reading and understanding of all aspects of this CENIS component. Section 3.1 deals with the operations required to collect the data and prepare them for input to the computer. Section 3.2 contains a description of the computer programs and datasets that are used in component operations. Section 3.3 is devoted to a description of the reports which are produced as the final products in analysis. Finally, Section 3.4 gives the information that is needed by the user to specify production of desired reports, using the control language. Subsequent chapters in this manual, which describe other CENIS components, will be structured in this same form.

Labor Demand data are derived from interviewing a sample of employers in Iowa. A master list of employers, along with the number of employees that fall within job classes of interest, the area of the state, and general type of firm (SIC number), is available through the Department of Public Instruction (DPI). Each employer is given a unique identification number (firm ID).

The sample of firms for the 1972 Labor Demand Study was selected from a list of firms in Iowa provided by the Department of Public Instruction.

Since separate estimates were desired for each of the 15 Merged Areas in the state, these areas were designated as strata for sampling purposes, and sampling was carried out separately within each area. However, the general procedure was the same for all strata.

1. The larger firms (in terms of number of employees according to the list) were selected with certainty. The definition of "large" varied, being 25 or more employees in the 3 smallest strata (smallest in terms of number of firms), 75 or more in the 3 largest strata, and 50 or more in the remaining 9 strata.
2. Each firm in the universe was assigned a number under the Standard Industrial Classification (SIC) system. Certain of these SIC categories were designated by personnel of the Department of Public Instruction as "critical" SIC's. The researchers wanted to be certain that each so-called critical SIC category was represented by at least one firm in the sample. If the category was not already represented by a firm in the large-firm certainty sample and if the number of firms in the category was not sufficient to assure that at least one firm would be selected in the systematic sample (to be described next), then the largest firm in the category was selected with certainty to represent all firms in the SIC category.
3. The remaining firms (those not selected in the large-firm certainty sample and not having "critical" SIC numbers) were sampled in a systematic manner after being ordered by size within SIC category. That is, a sampling rate of 1 out of k was set for the stratum, and a number, r, between 1 and k was selected at random. Going through the ordered list, the computer selected the rth firm and every k^{th} firm thereafter

to be in the sample. As was discussed previously, a SIC category having fewer than k firms was designated as "critical". In order to keep the number of critical SIC's as low as possible, a lower limit of 1 out of 10 was tentatively set as the minimum desirable rate for the systematic sample. Starting with a rate of 1 out of 10 in the largest stratum, sampling rates were established in the remaining strata which would yield approximately equally precise estimates under the assumption that the stratum variances were proportional to the number of different SIC categories represented by firms in the stratum.

With one exception, this procedure resulted in sampling rates ranging from 1 out of 5 to 1 out of 8 (after rounding to integral intervals). In the exceptional stratum, a rate of 1 out of 12 was indicated. It was felt by personnel of the Department of Public Instruction that the comparatively low number of SIC categories in this stratum did not accurately reflect the diversity to be found there; consequently, the rate was increased to 1 out of 6, the rate already established for other strata of about the same size.

Standardized interview forms were printed for the various categories of occupations and were used by interviewers. An example of these forms is shown in Figure 3.1.1. An extensive amount of effort was, of course, expended in checking and traceback to interviewers prior to accepting many of the interview forms. Many different types of relatively small problems were encountered, and had to be resolved, before the final set of completed interview forms were obtained. These problems included the following:

1. In some cases the wrong firm was visited by the interviewer. The result was a fewer, or far more, employees reported than were actually supposed to be employed by the firm, or no employees in relevant jobs.
2. Firms having branch plants both in, and outside, of Iowa were hard pressed to estimate only their Iowa operations. Some of these refused to respond.
3. Incorrect recording of firm ID number on the interview form produced interviewer records which were difficult to match to the correct firm identification.
4. Incorrect or missing merged area number on the interview form created a problem in locating the proper area, although this problem was readily solvable if the correct firm ID was present.

Subsequent sample surveys should be far less difficult in view of the experience gained in conducting this first survey.

It should be emphasized at this point that a categorization of occupations was used to place all jobs into one of eighteen categories. The category number and title appear as a part of the heading on the Labor Demand interview forms. A list of the category numbers and titles is given in Table 3.1.1. Some computer output reports in this component feature a breakdown, in analysis, by occupational category.

Once the sample is drawn and the interviewer records are accepted, the data are ready for keypunching. The card format used in keypunching data is shown in Table 3.1.2. The device of punching line number was used to avoid the necessity of punching DOT code number. An overlay template was used so that keypunch operators did not have to count lines in order to determine line number. Needless to say, only those lines which con-

tained recorded data were considered in keypunching. Also, some editing of punched data should be, and was in the first survey, carried out to insure that there are no keypunching errors present.

The final step in preparation of survey data, for entry into the CENIS software system, is to apply appropriate weights to the observed data. Weights are derived based on total numbers of employees and firm characteristics. The sampling design, as previously described, dictates the way in which prescribed weights will be determined. Once they are determined, the card data are input and each set of observed values is multiplied by the appropriate weight. These weighted data are placed on tape, in a form which is specified in Table 3.1.3, and are then ready for entry into the CENIS software system.

In order to use these data, some device must be available to translate from line number to DOT number so that correct numbers and titles can be reported. To accomplish this, a master deck of DOT numbers and titles, and the associated Taxonomy number and title of each, was prepared. One record for each line, within categorized form, is present for use in the CENIS computer software package. The usage of this dataset will be described in succeeding sections. A list of the DOT/TAXONOMY classifications present in the current system is given in Table 3.1.4. A card layout for punching these data, with respect to form line number, is given in Table 3.1.5.

6310-B8458-6/72

STATEWIDE LABOR DEMAND SURVEY

CONFIDENTIAL

10 - MANUFACTURING OCCUPATIONS

I.D. No._____

CE-10 5/72

Merged Area: 99____

D.O.T. Code Number	Job Title	Present No. of F-T Employees	Current No. of Vacancies	Estimated Employment Sept. 1973	Estimated Employment Sept. 1975	Estimated Employment Sept. 1977	Replacement Needs Sept. 1973	Replacement Needs Sept. 1975	Replacement Needs Sept. 1977	Job Vacancy Hard to Fill? Yes	Job Vacancy Hard to Fill? No	In-Plant Training (80 hours or more) Current No. Of Trainees	No. Completing Training By Sept. 1973	No. Completing Training By Sept. 1975
007.281-014	Draftsman, Mechanical													
142.081-078	Industrial Designer													
609.684-010	Inspector, General													
518.381-022	Foundry Molder													
518.381-014	Coremaker													
514.884-030	Metal Pourer													
514.782-022	Die-Casting Machine Operator													
600.280-066	Patternmaker, Metal													
600.280-030	General Machinist													
600.380-026	Machine Set-Up Operator													
609.885-022	Production Machine Operator													
601.280-062	Tool and Die Maker													
007.187-022	Numerical Control Tool Programmer													
609.782-054	Tape Control Machine Operator													
609.782-026	Electrical Discharge Machine Operator													
813.885-010	Welder, Resistance Machine													
812.884-014	Welder, Combination													
810.884-014	Welder, Inert Gas Shielded Arc													
816.782-014	Flame Cutting Machine Operator													
617.885-042	Punch Press Operator													
617.280-018	Press Operator, Heavy Duty													
809.381-010	Fabricator-Assembler, Metal Products													
829.281-022	Electrician, Maintenance													
638.281-026	Industrial Maintenance Mechanic													
556.782-030	Plastics Injection Molding Machine Operator													
557.782-010	Plastics Extrusion Molding Machine Operator													
556.782-014	Plastics Compression Molding Machine Operator													
554.782-034	Plastics Calendar Roll Operator													
690.885-166	Plastics Heat Sealing Machine Operator													
556.885-102	Plastics Vacuum Forming Machine Operator													
660.280-010	Cabinetmaker													
662.782-074	Woodworking Machine Operator													
763.884-036	Furniture and Hardware Assembler													

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CONFIDENTIAL

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STATEWIDE LABOR DEMAND SURVEY

10 - MANUFACTURING OCCUPATIONS (Cont.)

I.D. No._____

Merged Area: 99____

D.O.T. Code Number	Job Title	Present No. of Full Employees	Current No. of Vacancies	Estimated Employment Sept. 1973	Estimated Employment Sept. 1975	Estimated Employment Sept. 1977	Replacement Needs Sept. 1973	Replacement Needs Sept. 1975	Replacement Needs Sept. 1977	Job Vacancy Hard to Fill? Yes	Job Vacancy Hard to Fill? No	In-Plant Training (80 hours or more) Current No. Of Trainees	No. Completing Training By Sept. 1973	No. Completing Training By Sept. 1975
922.883-018	Industrial Truck Operator													
787.782-290	Sewing-Machine Operator, All Around													
789.884-054	Leatherworker													
003.281-026	Instrumentation Technician													
003.181-010	Electrical Technician													
003.181-014	Electronic Technician													
022.281-014	Chemical Technician													
019.281-018	Quality Control Technician													
029.281-018	Laboratory Food Tester													
011.281-014	Metallurgical Assistant													
710.281-018	Electromechanical Technician													
007.181-026	Mechanical Engineering Technician													
012.288-010	Industrial Engineering Technician													
012.081-010	Industrial Safety Technician													
079.181-010	Industrial Hygienist													
621.281-042	Fluid Power Technician													
289.158-010	Sales Manager, Industrial													
	ADDITIONAL OCCUPATIONS	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX

Table 3.1.1 Occupational Category Numbers and Titles

Number	Category Title
1	Agri-Business
2	Agriculture Production and Services
3	Automotive Services Occupations
4	Banking, Insurance and Real Estate
5	Business and Office Occupations
6	Construction Occupations
7	Business Services Occupations
8	Food Services and Lodging Occupations
9	Health Occupations
10	Manufacturing Occupations
11	Personal Services Occupations
12	Printing and Publishing Occupations
13	Public Service Occupations
14	Radio and Television Broadcasting Occupations
15	Repair Service Occupations
16	Retail and Wholesale Trade Occupations
17	Technical and Consultative Occupations
18	Transportation Related Occupations

Table 3.1.2 Card Layout for Labor Demand Data Keypunching

Card Columns	Interview Form Item
2-6	Firm ID number
7-8	Merged area number
10-11	Category number
13-14	* Line number
16-19	Present no. full time employees
21-24	Current no. vacancies
26-29	Estimated employment, 1973
31-34	Estimated employment, 1975
36-39	Estimated employment, 1977
41-43	Replacement needs, 1973
45-47	Replacement needs, 1975
49-51	Replacement needs, 1977
53-54	Job vacancy (10=YES), (01=NO)
56-58	Current no. in-plant trainees
60-62	Trainees completing, 1973
64-66	Trainees completing, 1975

* This number is not on the form. It is the number of the line in the body of the form, counting consecutively from the first line. An overlay template was used to assist keypunchers in reading the correct line number.

Table 3.1.3 Tape Record Format for Weighted Labor Demand Survey Data

Word Number	Item
1	Category number
2	Merged Area number
3	Line number
4-6	DOT number
7-8	Taxonomy number
9	Firm ID number
10	Padding
11	Number of full-time employees
12	Current no. vacancies
13	Estimated employment, 1973
14	Estimated employment, 1975
15	Estimated employment, 1977
16	Replacement needs, 1973
17	Replacement needs, 1975
18	Replacement needs, 1977
19	Job vacancy fill (code 10 or 01)
20	Current no. trainees
21	Number of trainees, 1973
22	Number of trainees, 1975
23	Sort digit for placing DOT's in order
24	Sort digit for placing Taxonomy's in order
25	Padding

Table 3.1.4 Taxonomy and DOT Tables

STATEWIDE LABOR DEMAND SURVEY

OE/DOT CONVERSION TABLE

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
01.01	Agr. Production	421.883-010	Farm Hand, General
01.0101	Animal Science	429.228-010	Poultryman, Tech. Advi.
01.0104	Farm Business Mgmt.	409.168-010	Manager., Farm
01.02	Agr. Supplies/Services	044.384-014	Feed-Research Aid
01.0201	Agr. Chemicals	424.883-014	Sprayer
"	"	389.884-101	Exterminator
01.0202	Feeds	529.138-026	Supt. Grain Elev.
"	"	520.885-122	Feed Mixer
"	"	529.132-014	Custom Feed Mill Opr.
"	"	096.128-022	Feed & Farm Mgmt. Advisor
"	"	262.358-014	Salesman, Grain & Feed
"	"	529.132-014	Custom Feed Mill Opr.
01.0203	Seeds	040.381-014	Seed Analyst
01.0299	Agr. Supplies/Svcs., Other	356.874-016	Veterinary Asst.
"	"	073.381.010	Veterinary Lab. Tech.
01.0301	Agr. Power & Mchry.	624.281-010	Farm Equip. Mech.
"	"	624.381-014	Farm Mch. Set-up Man
"	"	289.358-058	Counterman, Farm Equip. Pts.
01.0401	Food Products	162.168.010	Buyer, Grain
"	"	162.158-010	Buyer, Livestock
01.0504	Landscaping	407.181-010	Landscape Gardner
01.0505	Nursery Opr. and Mgr.	406.168-010	Nurseryman
01.0506	Turf Management	407.137-010	Greenskeeper
"	"	407.138-010	Supt., Greens
"	"	407.134-010	Park Foreman
01.0603	Soil	040.081-074	Soil Conserv. Aid
01.0605	Water	954.782-030	Watershed Tender
04.01	Advertising Services	050.088-034	Market Research Analyst
"	"	164.168-010	Account Executive
"	"	165.068-022	Public Rel. Spec.
"	"	164.068-010	Advertising Asst.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
04.02	Apparel and Access.	185.158-010	Fashion Coordinator
"	"	263.358-038	Salesprsn., Fash. Access.
"	"	263.358-046	Salesprsn., Men's Furnish.
"	"	263.458-022	Salesprsn., Women's Garm.
04.03	Automotive	280.358-014	Salesmn., Auto.
"	"	289.358-046	Counterman, Auto. Pts.
04.04	Finance and Credit	186.288-010	Loan Officer
"	"	212.368-010	Teller
"	"	251.258-010	Salesmn., Securities
"	"	168.168-050	Credit & Collect. Mgr.
04.05	Floristry	142.081-050	Floral Designer
"	"	260.458-010	Salesprsn., Flow. & Flor. Sup.
04.06	Food Distribution	299.138-014	Dept. Head, Suprmkt.
"	"	290.887-010	Salesprsn., Food
"	"	299.468-010	Cashier/Checker
04.07	Food Services	310.868-010	Restaurant Hostess
04.08	General Mdse.	263.458-026	Salesprsn., Fabrics & Hm. Sew.
"	"	289.458-014	Salesprsn., General
"	"	185.168-058	Retail Store Mgr.
"	"	162.168-030	Buyer, Asst. Buyer
04.09	Hdwe., Bldg. Mater., Farm & Garden Sup. & Equip.	277.358-018	Salsmn., Farm & Grdn. Equip.&
"	"	277.358-026	Salsmn., Tract. & Farm Imp.
"	"	276.358-058	Salesprsn., Hdwe. & Bldg. Sup.
"	"	277.358-030	Salesprsn., Lawn & Grdn. Sup.
04.10	Home Furnishings	142.051-014	Interior Design. & Decor.
"	"	278.358-014	Salesprsn., Hm. Furnish.
"	"	096.128-034	Hm. Furnish. Asst.
04.11	Hotel & Lodging	320.137-010	Mgr., Lodging Facilities
"	"	324.878-014	Bellman
04.12	Industrial Marketing	289.158-010	Sales Mgr., Indus.
"	"	289.158-010	Mfg.'s Rep.
"	"	289.358-014	Salesmn., Indus. Prod.
04.13	Insurance	186.168-030	Mgr, Trainee, Ins. Off.
"	"	250.258-014	Salesmn., Ins.
04.16	Petroleum	915.867-010	Serv. Sta. Attendant
"	"	168.287-038	Field Rep., Petroleum
"	"	185.168-058	Mgr., Serv. Sta.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
04.17	Real Estate	250.358-026	Salesman, Real Estate
04.18	Recreation & Tourism	195.168-026	Director, Recreation
"	"	286.358-010	Salesperson, Sporting Goods
04.19	Transportation	922.883-018	Industrial Truck Operator
"	"	906.883-026	Light-Truck Driver
"	"	905.883-014	Tractor-Trailer Truck Driver
"	"	255.258-010	Traffic Agent
"	"	919.168-010	Dispatcher, Motor Vehicle
"	"	184.168-090	Manager, Traffic
"	"	019.188-010	Traffic Engineer
07.0101	Dental Assisting	079.378.010	Dental Assistant
07.0102	Dental Hygiene	078.368-014	Dental Hygienist
07.0103	Dental Lab. Tech.	712.381-014	Dental Lab. Tech.
07.0201	Cytology	078.281-014	Cytolechnologist
07.0203	Medical Lab. Assisting	078.381-010	Med. Lab. Assistant
07.0301	Nursing	075.378-014	Nurse, General
07.0302	Practical Nursing	079.378-026	Nurse, Licensed Practical
07.0303	Nursing Assistance	355.878-034	Nurse Aid/Orderly
07.0305	Surgical Tech.	079.378-042	Operating Room Tech.
07.0307	Home Health Aid	354.878-014	Home Health Aid
07.0401	Occupational Therapy	079.368-026	Occupational Therapy Aide
07.0402	Physical Therapy	355.878-014	Physical Therapy Attendant
07.0404	Orothotics	712.281-018	Orthopedic Applicance Tech.
07.0501	Radiologic Tech.	078.368-030	Radiologic Technician
07.0502	Radiation Therapy	199.187-010	Radiation Technician
07.0503	Nuclear Med. Tech.	078.381-014	Nuclear Med. Tech.
07.0601	Ophthalmic Dispensing	007.081-042	Optical Assistant
07.0701	Environ. Health Asst.	168.287-094	Environ. Health Asst.
07.0801	Mental Health Tech.	355.878-042	Mental Health Tech.

axonomy No.	Taxonomy Title	DOT No.	DOT Title
7.0901	Electroencephalograph Tech.	078.368-022	Electroencephalograph Tech.
7.0902	Electrocardiograph Tech.	078.368-018	Electrocardiograph Tech.
7.0903	Inhalation Therapy	079.368-018	Inhalation Therapist
7.0904	Med. Asst.	079.368-022	Med. Asst.
7.0907	Med. Emergency Tech.	355.878-026	Med. Emergency Tech
7.0908	Food Serv. Supervisor	079.588-010	Dietetic Tech.
7.99	Health Occup., Other	070.108-094	Physician's Asst.
9.0201	Care & Guid. of Child.	359.878-014	Child Care Attend./Asst.
9.0202	Cloth. Mgt., Prod., and Serv.	309.878-010	Cloth. Maintenance Specialist
9.0203	Food Mgt., Prod., and Serv.	187.168-014	Caterer
"	"	187.168-126	Food Establishment Mgr.
"	"	310.138-010	Kitchen Supervisor
9.0204	Home Furnish., Equip. and Serv.	278.258-010	Home Serv. Rep.
9.0205	Inst. & Home Mgt. & Sup. Serv.	321.138-010	Housekeeper, Inst.
14.0101	Accountants	160.288-010	Accounting Technician
"	"	160.288-018	Cost Estimator
14.0102	Bookkeepers	210.388-022	Bookkeeper
14.0103	Cashiers	211.468-010	Cashier
14.0104	Mach. Oper: Billing, Bookkeeping, & Computing	215.388-010	Office Mach. Oper.
14.0201	Computer and Console Oper.	213.382-018	Computer Oper.
"	"	213.138-010	Computer Operations Supervisor
14.0202	Peripheral Equip. Oper.	213.582-010	Key-Punch Oper.
14.0203	Programmers	020.188-026	Programmers
14.0204	Systems Analysts	012.168-022	Systems Analyst
14.0201	Duplicating Mach. Oper.	207.782-014	Duplicating Mach. Oper.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
14.0302	File Clerks	206.388-018	File Clerk
14.0303	General Office Clerks	219.388-066	General Office Clerk
"	"	219.388-258	Statistical Clerk
14.0399	Filing, Off. Mach. & Gen. Off. Clerical, Other	208.588-026	Transcribing Mach. Oper.
14.0401	Communications Systems Clerks & Oper.	235.862-026	Telephone Oper.
14.0403	Mail & Postal Clerks	231.588-014	Mail Clerk
14.0406	Receptionists & Information Clerks	237.368-038	Receptionist
14.0499	Information Communication Occupa., Other	249.268-014	Survey Worker
"	"	249.368-050	Library Asst.
14.0503	Ship. & Receiving Clerks	222.387-026	Ship. & Receiving Clerk
14.0702	Secretaries	201.368-010	Legal Secretary
"	"	201.368-014	Medical Secretary
"	"	201-368.018	Secretary
14.0703	Stenographers	202.388-014	Stenographer
"	"	202.388-022	Stenotype Oper.
14.0805	Off. Mgr. & Chief Clerks	169.168-062	Off. Super.
14.0901	Clerk-Typists	209.388-022	Clerk-Typist
15.0105	Chemical Tech.	022.281-014	Chemical Tech.
15.0106	Civil Tech.	018.188-026	Surveyor
"	"	005.181-010	Civil Engineering Tech.
15.0107	Electrical Tech.	003.181-010	Electrical Tech.
15.0108	Electronic Tech.	003.181-014	Electronic Tech.
"	"	957.282-014	Control Room Tech., Radio & TV
"	"	729.281-034	Electromedical Equip. Tech.
"	"	828.281-022	Electronics Mech.
15.0109	Electromechanical Tech.	710.281-018	Electromechanical Tech.
15.0110	Environmental-Control Tech.	168.287-054	Industrial Waste Inspector
"	"	954.782-018	Solid Waste Tech.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
6.0111	Industrial Tech.	638.281-026	Industrial Maintenance Mech.
"	"	012.288-010	Industrial Engineering Tech.
"	"	012-288-010	Industrial Safety Tech.
6.0112	Instrumentation Tech.	003.281-026	Instrumentation Tech.
6.0113	Mechanical Tech.	007.187-022	Numerical Control Tool Progammer
"	"	007.181-026	Mechanical Engineering Tech.
"	"	019.281-018	Quality Control Tech.
6.0114	Metallurgical Tech	011.281-014	Metallurgical Asst.
6.0200	Agr.-Related Tech.	168.287-010	Agr.-Commodity Inspector
6.0399	Health-Related Tech., Other	079.878-010	Industrial Hygienist
6.0599	Home Ec-Related Tech., Other	189.878-010	Social Serv. Aid
6.0602	Fire & Fire Safety Tech.	168.168-010	Building Inspector
6.0699	Misc. Tech., Other	012.081-010	Industrial Safety Tech.
"	"	621.281-042	Fluid Power Tech.
"	"	029.281-018	Lab. Food Tester
"	"	729.281-010	Educational Media Tech.
"	"	954.782-026	Waste Water Tech.
7.0100	Air Conditioning	620.281-010	Auto. Air-Cond. Mech.
"	"	637.281-010	Air Cond. Mech.
7.0101	Cooling	637.281-034	Refrigeration Mech.
7.0102	Heating	869.281-010	Furn. Install. & Repair
7.0199	Air Conditioning, Other	884.884-014	Cement Mason
7.0201	Electrical Appliances	827.281-014	Elec. Appliance Repair
"	"	723.281-018	Elec. Appliance Repair
7.0202	Gas Appliances	637.281-022	Gas Appliance Serviceman
7.0301	Body & Fender	807-381.010	Auto. Body Repairman.
"	"	845.781-018	Auto. Painter
7.0302	Mechanics	620.281-014	Auto. Mech.
7.0303	Specialization, Other	620.281-034	Auto. Brake Mech.
"	"	620.281-062	Auto. Front-End Align. Mech.
"	"	620.281-098	Auto. Transmission Mech.
"	"	620.381-014	Auto. Serv. Sta. Mech.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
17.0401	Aircraft Maintenance	621.281-010	Aircraft & Engine Mech.
17.0402	Aircraft Operations	621.281-038	Flight Engineer
"	"	193.168-014	Ground Control Specialist
17.06	Business Mach. Maintenance	633.281-030	Off. Mach. Serviceman
17.07	Commercial Art Occup.	970.381-046	Sign Painter
"	"	141.081-042	Issultrator
17.0701	Interior Decorating	142.051-014	Interior Decorator
17.0702	Window Display	298.081-010	Display Man
17.0703	Product Design	142.081-078	Industrial Designer
17.09	Comm. Photo. Occup.	142.062-034	Photographer
17.0901	Photo. Lab. & Dkrm. Occup.	976.381-010	Developer
"	"	976.887-018	Photographic Asst.
17.10	Construction & Maintenance Trades	899.381-010	Bldg. Maintenance Man
17.1001	Carpentry	860.381-026	Carpenter
"	"	860.381-038	Form Builder
17.1002	Electricity	824.281-014	Electrician
17.1003	Heavy Equip.	859.883-030	Operating Engineer
"	"	620.281-046	Construction Equip. Mech.
17.1004	Masonry	861.381-010	Bricklayer
"	"	861.781-038	Tile Setter
17.1005	Painting & Decorating	840.781-010	Painting
17.1007	Plumbing & Pipefitting	862.381-074	Plumber
"	"	862.381-042	Pipefitter
17.1008	Dry-Wall Installation	842.884-010	Dry Wall Applicator
17.1009	Glazing	865.781-010	Glazier
17.1010	Roofing	866.381-010	Roofer
17.1099	Construction & Main. Trades, Other	801.781-010	Structural Steel Worker
"	"	864.781-010	Floor Layer
"	"	863.884-030	Siding Applicator
"	"	299.381.010	Carpet & linoleum Layer

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
7.1100	Custodial Services	382.884-010	Custodian
7.1200	Diesel Mech.	625.281-010	Diesel Mech.
"	"	621.381-022	Fluid Power Mech.
7.1300	Drafting	001.281-010	Draftsman, Architectural
"	"	005.281-018	Draftsman, Structure
"	"	007.281-014	Draftsman, Mechanical
7.1400	Electrical Occupations	829.281.022	Electrician, Maintenance
7.1402	Lineman	821.381-034	Lineman
7.1403	Motor Repairman	721.281-022	Electric Motor Repairman
7.1501	Communications	822.281-026	Comm. Equip. Repairman
7.1503	Radio/Television	720.281-018	TV & Radio Serviceman
7.1599	Electronics Occup., Other	159.148-010	Announcer, Radio & TV
"	"	184.168-022	Program Director, Radio & TV
7.1601	Drycleaning	362.782-010	Dry Cleaner
"	"	369.884-026	Carpet & Upholstery Cleaner
7.1602	Laundering	369.884-022	Launderer
7.1900	Graphic Arts Occup.	659.130-010	Print Shop Foreman
7.1901	Composition, Makeup & Typesetting	650.582-022	Phototypesetter Oper.
"	"	650.582-014	Linotype Oper.
7.1902	Printing Press Occup.	651.782-042	Offset Pressman
"	"	651.782-054	Platen & Letter Pressman
7.1903	Lithography, Photo. & Platemaking	972.382-010	Photographer, Lithographic
7.1906	Bookbinding	977.781-010	Bookbinder
7.2101	Instruments	710.281-058	Instrument Repairman
7.2102	Watchmaking & Repair	715.281-018	Watch Repairman
7.2301	Foundry	518.381-022	Foundry Molder
"	"	518.381-014	Coremaker
"	"	514.884-030	Metal Pourer
"	"	514.782-022	Die-Casting Mach. Oper.

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
17.2302	Machine Shop	600.280-050	Automotive Machinist
"	"	600.280-066	Patternmaker, Metal
"	"	600.280-030	General Machinist
"	"	609.782-054	Tape Control Mach. Oper.
"	"	609.782-026	Electrical Discharge Mach. Oper.
17.2303	Mach. Tool Operation	609.885-022	Production Mach. Oper.
17.2304	Metal Trades, Combined	600.380-026	Mach. Set-Up Oper.
"	"	617.885-042	Punch Press Oper.
"	"	617.280-018	Press Oper., Heavy Duty
"	"	809.381-010	Fabricator-Assembler, Met. Prod.
17.2305	Sheet Metal	804.281-010	Sheet Metal Worker
17.2306	Welding & Cutting	812.884-014	Welder, Combination
"	"	810.884-018	Welder, Arc
"	"	811.884-014	Welder, Gas
"	"	813.885-010	Welder, Resistance Mach.
"	"	810.884-014	Welder, Inert Gas Shielded Arc
"	"	816.782-014	Flame Cutting Mach. Oper.
"	"	812.884-022	Repair Welder
17.2307	Tool & Die Making	601.280-062	Tool & Die Maker
17.2601	Barbering	330.331-010	Barber
17.2602	Cosmetology	330.331-010	Cosmetologist
17.2699	Personal Serv., Other	334.878-010	Masseur
"	"	334.878-014	Reducing Salon Attendant
17.2700	Plastics Occupations	556.782-030	Plastics Inject. Mold. Mach. Oper.
"	"	557.782-010	Plastics Extrusion Mold. Mach. Oper.
"	"	556.782-014	Plastics Compression Mold. Mach. Oper.
"	"	554.782-034	Plastics Calendar Roll Oper.
"	"	690.885-166	Plastics Heat Sealing Mach. Oper.
"	"	556.885-102	Plastics Vacuum Forming Mach. Oper.
7.2800	Public Serv. Occup.	168.168-010	Bldg. & Safety Inspector
7.2801	Fireman Training	373.884-014	Fireman
7.2901	Baker	313.781-010	Baker
"	"	313-884-010	Baker Helper
7.2902	Cook/Chef	313.381-018	Cook
"	"	317.887-010	Cook Helper

Taxonomy No.	Taxonomy Title	DOT No.	DOT Title
17.2903	Meat Cutter	316.884-018	Meat Cutter
17.2904	Waiter/Waitress	311.878-058	Waiter/Waitress
17.31	Small Engine Repair, Internal Combustion	620.281-086	Motorcycle Repairman
"	"	624.281-034	Gasoline Engine Repairman
17.3399	Textile Production & Fabrication, Other	363.782-018	Steam Press Oper.
"	"	787.782-054	Sewing-Maching Oper., All Around
17.34	Leatherworking	789.884-054	Leatherworker
17.35	Upholstering	780.381-018	Upholsterer
17.3601	Millwork & Cabinet Making	660.280-010	Cabinetmaker
"	"	662.782-074	Woodworking Mach. Oper.
"	"	763.884-036	Furniture & Hdwe. Assembler
17.99	Trade & Industrial Occup., Other	609.684-010	Inspector, General
"	"	639.884-010	Bicycle Repairman
"	"	639.381-014	Vending Machine Repairman
"	"	730.281-038	Musical Instrument Repairman
"	"	730.381-050	Piano Tuner

Table 3.1.5 Card Layout for Punching Taxonomy and DOT Descriptions

Card Number	Card Columns	Description
1	1-7	Taxonomy number
1	8-47	Taxonomy title
1	48-66	Blank
1	67	Card number
1	68-80	DOT number
2	1-7	Taxonomy number
2	8-47	DOT title
2	48-66	Blank
2	67	Card number '2'
2	68-80	Blank
3	1-2	Number of lines within category
3	4-5	Category number
3	9-10	Line number
3	12-15	Sort digit for placing records in order by DOT number
3	17-20	Sort digit for placing records in order by Taxonomy number
3	21-66	Blank
3	67	Card number '3'

(Note: The first card in this card deck is not in the above given format. This card contains the year numbers to be printed on the output reports. These numbers correspond to years 1973, 1975, and 1977. Punch the card as 1973197519777377577 beginning in column 4.)

3.2 Labor Demand Data Analysis and Report Generation Software

3.2.1 Component Programs

There are sixteen small component programs which perform analysis and report generation functions relative to the Labor Demand portion of CENIS. These programs are each referenced using a different operand name in the control language. The supervisor, in its internal operations, recognizes the programs by program number. Additionally, each program has a name as required by the programming languages used in implementation of CENIS. The program name and program number are only of interest to programmers who will modify the system. Only the operand name is needed, by the user of CENIS software, to produce component reports. Table 3.2.1 lists operand names, and associated program name and number, for each of the major component programs.

In addition to the above named programs there are sixteen utility routines which perform sorting and other data preparation functions in support of the analysis and report generation programs. These programs are not given an operand name because they cannot, and need not, be designated in the user control language. These programs are listed by name in Table 3.2.2, along with the name of the program that each supports.

Flow of control between these programs can be easily summarized. Figures 3.2.1 through 3.2.4 provide this summarization. A brief description of these figures will be given in succeeding paragraphs. Information relative to specific makeup of data files will be given in separate subsection. A summary of sorting sequences is given in Table 3.2.4.

Table 3.2.1 Labor Demand Analysis and Report Generation Support Programs

Operand Name	Program Name	Program Number
LABEL FILE	CDTODK	31
REPORT ONE	LDPG01	32
REPORT TWO	LDPG01	33
REPORT THREE	LDPG03	34
REPORT FOUR	LDPG04	35
REPORT FIVE	LDPG05	36
REPORT SIX	LDPG06	37
REPORT SEVEN	LDPG07	38
REPORT EIGHT	LDPG08	39
REPORT NINE	LDPG09	3A
REPORT TEN	LDPG10	3B
DEMAND FILE	LDMMPG	3C
REPORT ELEVEN	LDPG11	3D
REPORT TWELVE	LDPG12	3E
REPORT THIRTEEN	LDPG13	3F
INTERFACE FILE	LDINFL	40

Table 3.2.2 Utility Programs in the Labor Demand Component

Program Name	Program Supported
LDRP01	LDPG01
LDRP02	LDPG02
LDRP03	LDPG03
LDRP04	LDPG04
LDRP05	LDPG05
LDRP06	LDPG06
LDRP07	LDPG07
LDRP08	LDPG08
LDRP09	LDPG09
LDRP10	LDPG10
LDMMRT	LDMMPG
LDRP11	LDPG11
LDRP12	LDGP12
LDRP13	LDPG13
LODPGM	All of the above
SORT	All programs requiring a data sorting

The first diagram, Figure 3.2.1, shows that program CDTODK prepares a file of labels from card input. This file contains Taxonomy and DOT numbers and titles used in annotating output on printed reports. The number (22) shown in the figure indicates that the file created has DD name FT22F001. The dataset name is LDLBFL. This dataset is needed by all report generating programs and must be executed prior to calling for reports.

Figure 3.2.2 depicts the use of program LDINFL. This program creates and stores a dataset, by the same name LDINFL, for use in the production of Interface Component reports. The input dataset LDWTFL contains the weighted survey data described in section 3.1. This program must be executed before any Interface reports can be produced.

The Figure 3.2.3 applies equally well to any of the reporting programs LDRP01 - LDRP10. These reporting programs summarize the data in various ways which will be described later. The reports can be produced (called for) in any sequence, and any subset of the ten report sets can be obtained in a single computer run. The user specification for any report, say report number six, is

EXECUTE REPORT SIX.

Finally, Figure 3.2.4 illustrates the last two major operations in this component software. First, program LDMMRT oversees the creation of the dataset named LDDEFL. This operation is done only one time in a Labor Demand analysis. The user specification for creation of this file is accomplished using the command

EXECUTE DEMAND FILE.

Once this file is created, any or all of these last three report sets can

Figure 3.2.1 View of Program CDTODK

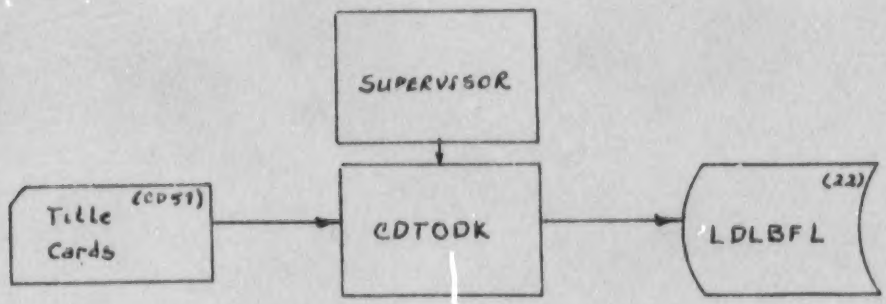


Figure 3.2.2 View of Program LDINFL

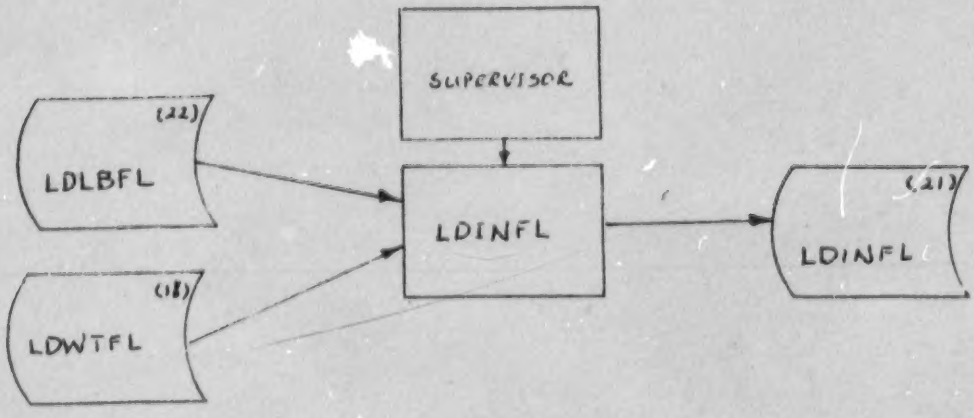


Figure 3.2.3 Typical Flow of Survey and Analysis Report Generation

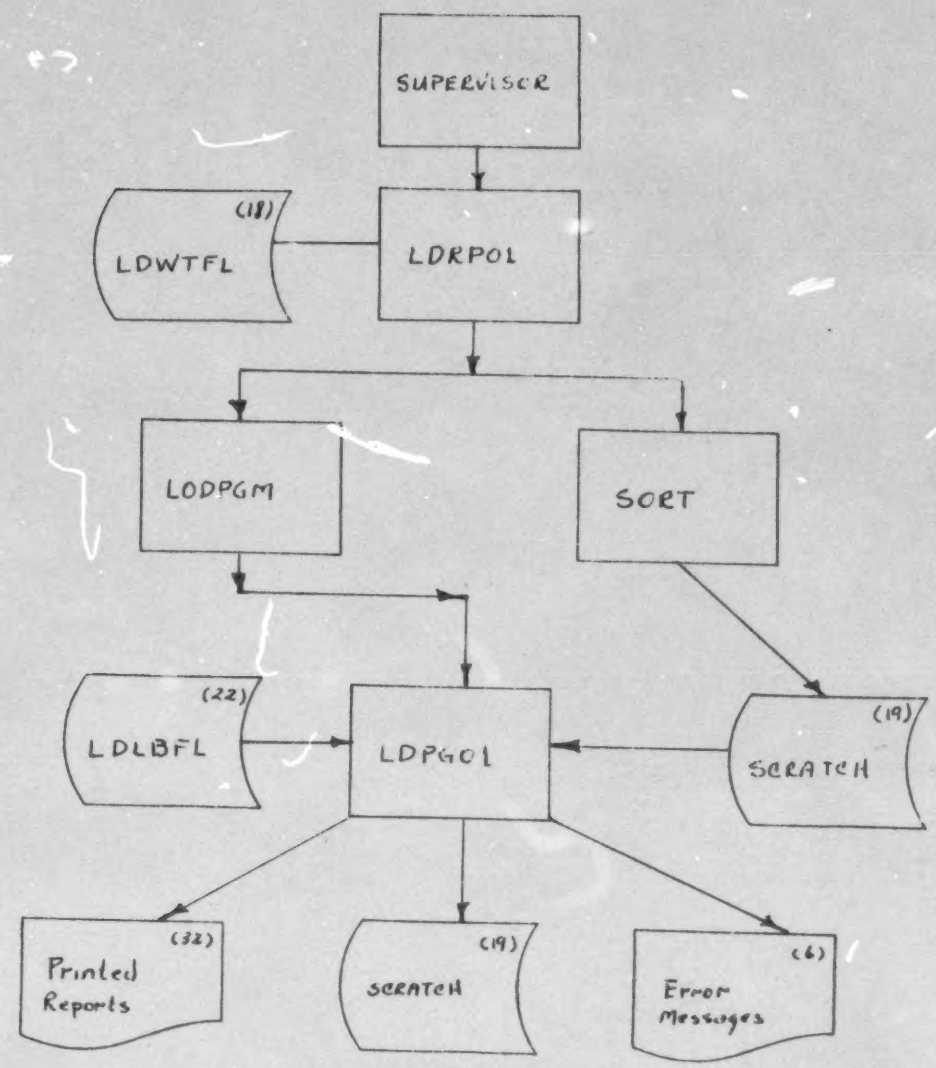
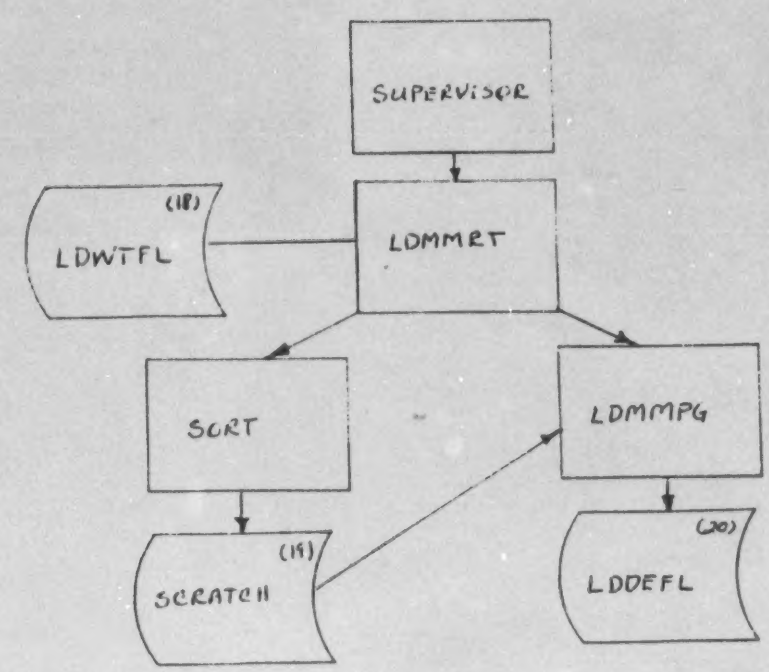
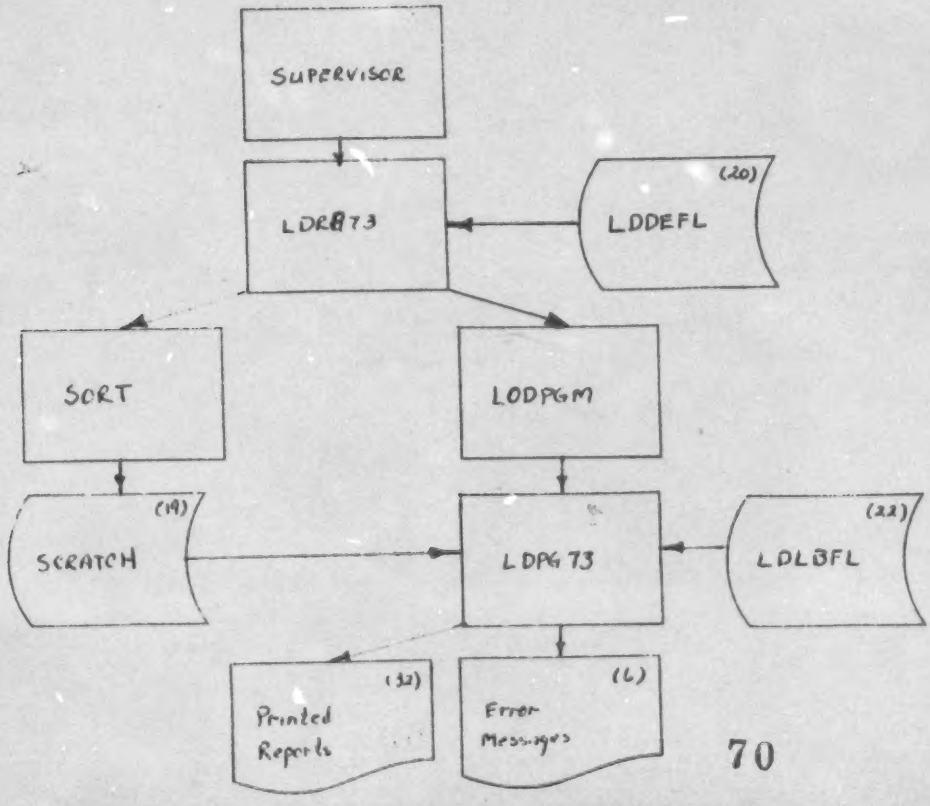


Figure 3.2.4 Typical Flow of Demand Report Generation





be produced using programs LDRP73 - LDRP75. The user specification for (say) report 1975 is

EXECUTE REPORT TWELVE.

3.2.2 Component Datasets

There are four named datasets that are created and/or used in analysis of labor demand data. These are the datasets named LDLBFL, LDWTFL, LDINFL, and LDDEFL. With the exception of LDDEFL, these will be described, in the given order, in succeeding paragraphs. Since LDDEFL is only used internally, it is essentially a scratch dataset that is used for three program executions, hence its specific format will not be given here.

The first of these datasets, named LDLBFL, contains annotative labels for Taxonomies, DOT's, categories, and titles for major breaks defined as a change in one of the first six digits in taxonomy number. For purposes of description, let us consider this dataset as being made up of three subsets. The first subset consists of three 80 byte records for each line on the Labor Demand Survey data collection form. The order of record sets is by category number referenced on the form. Hence category 1 records are first in the subset and there are three records for each line on the data collection form. The third of the three records, in the first record set, within each category specifies the number of lines considered within the category. Individual records are created in binary form and written in fixed blocks. The makeup of each three record sets is as follows.

Record Number	Character Position	Data Items in LDLBFL
1	1-7	Taxonomy number
1	8-67	Taxonomy title
1	68-80	DOT number
2	1-7	Taxonomy number
2	8-80	DOT title
* 3	1-2	Number of lines within category
3	3-5	Category number
3	6-10	Line number
3	11-15	Numeric sort key for DOT's
3	16-20	Numeric sort key for Taxonomies
3	21-80	blank

(* applicable only to first group of records within each category)

The card format for this subset is given in Table 3.1.5. The second subset consists of seven records, each 80 bytes in length. These are titles of major groups of taxonomy numbers. Finally, the third subset is made up of eighteen records, each 80 bytes in length, which contain the titles used to identify categories. This entire dataset is created from card input of a master deck. This deck is prepared, in an obvious fashion,

using the survey forms as guides to card creation.

The dataset LDWTFL contains the weighted data derived from interview of employers. The record length in this dataset is 100 bytes and record format is given in Table 3.1.3. The FORTRAN input format used to read these data in a report generation program is (25A4).

Finally, the dataset LDINFL contains, for each taxonomy, the area and statewide totals for 1) Number of persons employed full time, 2) Expected replacement needs in 1975, and 3) The expected number of in-plant trainees. Four 80 byte records are used to store the information in character form for each taxonomy. The record format is as follows:

Number	Character Positions	Data Items in LDINFL
1	1	Blank
1	2-8	Taxonomy number
1	9-28	Taxonomy title
1	29-33	Area 1 total full-time employees
1	34-38	Area 1 expected needs, 1975
1	39-43	Area 1 expected in-plant trainees
1	44-48	Area 2 total full-time employees
1	49-53	Area 2 expected needs, 1975
1	54-58	Area 2 expected in-plant trainees
⋮	⋮	⋮
1	75-79	Area 4 total full-time employees
2	1-5	Area 4 expected needs, 1975

Continued.

Number	Character Positions	Description
2	6-10	Area 4 expected in-plant trainees
⋮	⋮	⋮
4	16-21	Statewide total full-time employees
4	22-27	Statewide total expected needs, 1975
4	28-33	Statewide total in-plant trainees

As was mentioned previously, this dataset is used in the production of Interface Component reports which will be described in another chapter of this manual.

The characteristics of the computer files for the datasets described in this subsection are summarized in Table 3.2.3.

Table 3.2.3 Characteristics of Labor Demand Files

DD Name	DSNAME	RECFM	LRECL	BLKSIZE
FT18F001	LDWTFL	FB	100	3200
FT19F001	&&SCR03	FB	100	3200
FT20F001	LDDEFL	FB	80	3200
FT21F001	LDINFL	FB	80	3200
FT22F001	LDLBFL	FB	80	3200

Table 3.2.4 Sort Sequences Required by Labor Demand Survey and Demand Report Generation Programs

Reports Generated	Data sequencing Required by analysis program
ONE, TWO	Sorted by DOT within Taxonomy
THREE, FOUR	Sorted by DOT within Taxonomy within area
FIVE, SIX	Sorted by DOT within Taxonomy within category
SEVEN, EIGHT	Sorted by DOT within Taxonomy within category within area
NINE, TEN	Sorted by DOT

3.3 Labor Demand Reports

There are thirteen different reports which can be obtained in this component of CENIS. One page of each general report type is given in Figures 3.3.1 - 3.3.11. For purposes of discussion, these reports can be considered as being in three groups. The group names which we shall apply are:

1. Survey reports
2. Analysis reports
3. Demand listings

Within each group the main difference between reports is in the classifications used for subtotaling. This idea will become clearer as we consider each group, in turn, in the following subsections.

3.3.1 Labor Demand - Survey Reports

The survey reports are reports numbered 1, 3, 5, 7 and 9. In all of these reports the basic numerical entries in the body of the report are simply totals over the data items given in the column headings, and all of these items are a part of the basic weighted data derived in the survey. Line items which are printed, and used for subtotaling, are totals over individual DOT's. Differences between reports are defined by the way in which the data are divided into subsets and subtotals are generated. The following is a description of this format for each report:

Report 1 - This report gives state totals for each taxonomy, and grand totals for the state across taxonomies. The items on which these totals are generated are shown as the column headings of Figure 3.3.1.

Report 3 - This report considers each merged area separately. Totals for each taxonomy, major groups of taxonomies, and the entire area are generated. Figure 3.3.3 is an example of this report type.

Report 5 - The data within each category are considered and reported separately. Within category, taxonomy totals are produced and the totals for the category are also printed. Figure 3.3.5 is an example of this report type.

Report 7 - Category totals within each merged area are given in this type report. Totals for each taxonomy within category are also displayed. Figure 3.3.7 is an example of this report type.

Report 9 - This report type contains the same state totals as those in Report 1. The difference is that the totals in this ninth report are listed in order of ascending DOT number. Figure 3.3.9 depicts this situation.

3.3.2 Labor Demand - Analysis Reports

This type of report gives, for each of the years 73, 75, and 77, the four projected values called expansion, replacement, total demand, and percent expansion. The way in which these quantities are computed will now be described.

Expansion - This quantity is the difference between estimated employment for the given year (73, 75, or 77) and the number of full-time employees given or expected in the previous period.

Replacement - This quantity is simply the total projected replacement needs derived through sample survey.

Total Demand - Computed as the expected needs for the given year (73, 75, or 77) plus the replacement needs for the given year (73, 75, or 77) minus the current number of full-time employees.

Percent Expansion - Percentage, for the given year (73, 75, or 77), based on current number of full-time employees.

As in the case of survey reports, there are several analysis reports which differ only in the way that the data are divided and subtotals are generated. The analysis reports are Reports 2, 4, 6, 8, and 10. Examples of these reports are given in Figures 3.3.2, 3.3.4, 3.3.6, 3.3.8, and 3.3.10. The division of data and items in subtotals are directly analogous to the survey reports when the correspondence is known. This correspondence, or pairing, of survey and analysis reports is (1,2), (3,4), (5,6), (7,8), and (9,10). Thus, for example, Report 2 features state totals for each taxonomy and grand totals for the state, as does the Survey Report 1.

3.3.3 Labor Demand - Demand listings

The analysis report number 6 gives state totals in analysis. A key item in this report is the expected need for each of the years involved. When studying Report 6 in an effort to determine key statewide expected needs in the future, the presentation in this report is somewhat inconvenient. For this reason, three additional reports have been generated using the data displayed in Report 6. These three reports are derived by sorting lines in Report 6 according to expected need in each of the periods 1973, 1975, and 1977. The report numbers are, respectively, Reports ELEVEN, TWELVE, and THIRTEEN. Thus, for example, Report 1973 is a sorting of Report 6 in order of 1973 total need. Figure 3.3.11 illustrates these report formats.

Figure 3.3.1 Labor Demand - REPORT ONE

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STATE TOTALS

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TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	FULL TIME EMPL	CUR NO. VAC	ESTIMATED EMPLOYMENT 1973	1975	1977	REPLACEMENT NEEDS 73	75	77	IN-PLANT TRAIN CUR NO.	COMPLT. 73	75
17.2800	PUBLIC SERV. OCCUP.	168.168-010	BLDG. & SAFETY INSPECTOR	80	3	80	85	90	2	6	8	0	0	0
17.2800			TOTAL	80	3	80	85	90	2	6	8	0	0	0
17.2801	FIREMAN TRAINING	373.884-014	FIREMAN	849	16	897	902	930	27	40	59	0	0	0
17.2801			TOTAL	849	16	897	902	930	27	40	59	0	0	0
17.2802	LAW ENFORCEMENT TRAINING	375.268-030	POLICEMAN	939	13	982	1015	1030	47	64	80	0	0	0
17.2802			TOTAL	939	13	982	1015	1030	47	64	80	0	0	0
17.2901	BAKER	313.781-010	BAKER	829	21	848	858	865	101	110	125	0	0	0
17.2901	BAKER	313.884-010	BAKER HELPER	687	5	697	710	712	92	136	136	0	0	0
17.2901			TOTAL	1516	26	1545	1568	1577	193	246	261	0	0	0
17.2902	COOK/CHEF	313.381-010	COOK	3240	123	3414	3471	3502	461	701	714	0	0	0
17.2902	COOK/CHEF	317.887-010	COOK HELPER	1743	45	1782	1841	1848	296	401	459	0	0	0
17.2902			TOTAL	4983	168	5196	5312	5350	757	1102	1173	0	0	0
17.2903	MEAT CUTTER	316.884-018	MEAT CUTTER	569	48	1024	1064	1080	116	154	166	8	8	4
17.2903			TOTAL	569	48	1024	1064	1080	116	154	166	8	8	4
17.2904	WAITER/WAITRESS	311.878-058	WAITER/WAITRESS	5567	184	5836	6046	6094	2019	2549	2657	1	5	5
17.2904			TOTAL	5567	184	5836	6046	6094	2019	2549	2657	1	5	5
17.3100	SMALL ENGINE REPAIR, INTERNAL COMBUSTION	620.281-086	MOTORCYCLE REPAIRMAN	37	4	40	49	51	3	5	10	0	0	0
17.3100	SMALL ENGINE REPAIR, INTERNAL COMBUSTION	624.281-034	GASOLINE ENGINE REPAIRMAN	106	1	126	128	130	4	5	7	0	0	0
17.3100			TOTAL	143	5	166	177	181	7	10	17	0	0	0

Figure 3.3.2 Labor Demand - REPORT TWO

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

STATE TOTALS

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEEC	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEEC	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEEC	1977 % CHG
01.0100	AGR. PRODUCTION	421.882-010	FARM HAND, GENERAL	40	80	120	3	58	119	177	5	70	136	206	4
01.0100			TOTAL	40	80	120	3	58	119	177	5	70	136	206	4
01.0101	ANIMAL SCIENCE	429.228-010	POULTRYMAN, TECH ADVISOR	0	1	1	0	2	1	3	5	3	2	5	7
01.0101			TOTAL	0	1	1	0	2	1	3	5	3	2	5	7
01.0104	FARM BUSINESS MGMT.	409.168-010	MANAGER, FARM	2	0	2	2	3	0	3	3	3	0	3	3
01.0104			TOTAL	2	0	2	2	3	0	3	3	3	0	3	3
	AGRICULTURE OCCUPATIONS		TOTAL	42	81	123	3	63	120	183	4	76	138	214	5
		GRAND TOTALS		42	81	123	3	63	120	183	4	76	138	214	5

Figure 3.3.3 Labor Demand - REPORT THREE

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AREA 16 TOTALS

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TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	FULL TIME EMPL	CUR NO. VAC	ESTIMATED EMPLOYMENT 1973	1975	1977	REPLACEMENT NEEDS 73	75	77	IN PLANT TRAIN CUR NO. COMPLT. NO	75	77
17.3399	TEXTILE PRODUCTION & FABRICATION, OTHER	363.782-018	STEAM PRESS OPERATOR	4	0	4	4	4	0	0	1	0	0	0
17.3399	TEXTILE PRODUCTION & FABRICATION, OTHER	787.782-054	SEWING-MACHING OPER. ALL AROUND	25	0	31	34	34	8	9	8	0	0	0
17.3399			TOTAL	29	0	35	38	38	8	9	9	0	0	0
17.3400	LEATHERWORKING	789.884-054	LEATHERWORKER	4	0	4	4	4	2	4	4	0	0	0
17.3400			TOTAL	4	0	4	4	4	2	4	4	0	0	0
17.3500	UPHOLSTERING	780.381-018	UPHOLSTERER	3	0	3	4	4	0	0	0	0	0	0
17.3500			TOTAL	3	0	3	4	4	0	0	0	0	0	0
17.3601	MILLWORK & CABINET MAKING	660.280-010	CABINETMAKER	7	0	9	10	12	2	3	2	0	0	0
17.3601	MILLWORK & CABINET MAKING	662.782-074	WOODWORKING MACHINE OPERATOR	21	0	18	22	24	4	5	5	0	0	0
17.3601	MILLWORK & CABINET MAKING	762.884-036	FURNITURE & HOME. ASSEMBLER	45	0	49	55	57	6	11	11	0	0	0
17.3601			TOTAL	73	0	76	87	93	12	19	18	0	0	0
17.9900	TRADE & INDUSTRIAL OCCUP., OTHER	609.684-010	INSPECTOR, GENERAL	367	0	368	368	358	22	35	44	0	0	0
17.9900			TOTAL	367	0	368	368	358	22	35	44	0	0	0
	BUSINESS SERVICES OCCUPATIONS		TOTAL	6303	106	6476	6596	6625	445	691	725	1	1	1
	AREA 16 TOTALS			11605	205	11944	12217	12412	940	1350	1431	4	10	8

Figure 3.3.4 Labor Demand - REPORT FOUR

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

AREA 14 CATEGORY TOTALS

REPAIR SERVICE OCCUPATIONS

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
17.0100	AIR CONDITIONING	637.281-010	AIR COND. MECHANIC	0	0	0	0	0	1	1	0	0	0	0	0
17.0101	COOLING	637.281-034	REFRIGERATION MECH.	0	1	1	0	0	1	1	0	0	1	1	0
17.0201	ELECTRICAL APPLIANCES	827.281-014	ELEC. APPLIANCE SERVICEMAN	0	0	0	0	0	0	0	0	0	0	0	0
17.0202	GAS APPLIANCES	637.281-022	GAS APPLIANCE SERVICEMAN	0	0	0	0	0	0	0	0	0	0	0	0
17.0600	BUSINESS MACHINE MAINTENANCE	633.281-030	OFFICE MACHINE SERVICEMAN	0	0	0	0	0	0	0	0	2	0	2	200
17.1000	CONSTRUCTION & MAINTENANCE TRADES	899.381-010	BLDG. MAINTENANCE MAN	3	8	11	2	3	15	18	2	6	16	22	4
17.1403	MOTOR REPAIRMAN	721.281-022	ELECTRIC MOTOR REPAIRMAN	0	0	0	0	0	0	0	0	0	0	0	0
17.1501	COMMUNICATIONS	822.281-026	COMM. EQUIPMENT REPAIRMAN	0	3	3	0	0	3	3	0	0	3	3	0
17.1503	RADIO/TELEVISION	720.281-018	TV & RADIO SERVICEMAN	1	0	1	14	1	1	2	14	2	1	3	29
17.2306	WELDING & CUTTING	812.884-022	REPAIR WELDER	0	0	0	0	0	1	1	0	0	0	0	0
17.3100	SMALL ENGINE REPAIR, INTERNAL COMBUSTION	624.281-034	GASOLINE ENGINE REPAIRMAN	0	0	0	0	0	0	0	0	0	0	0	0
17.3500	UPHOLSTERING	780.381-018	UPHOLSTERER	0	0	0	0	1	0	1	33	1	0	1	33
	REPAIR SERVICE OCCUPATIONS		TOTAL	4	12	16	2	5	22	27	2	11	21	32	5

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LABOR DEMAND SURVEY

STATE CATEGORY TOTALS

PUBLIC SERVICE OCCUPATIONS

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	FULL TIME EMPL	CUR NO. VAC	ESTIMATED EMPLOYMENT 1973	1975	1977	REPLACEMENT NEEDS 73	75	77	IN PLANT TRAIN CUR NO. COMPLT. NO	75	77
01.0506	TURF MANAGEMENT	407.134-010	PARK FOREMAN	74	0	74	76	83	1	7	9	0	0	0
01.0433	SOIL	040.081-074	SOIL CONSERV. AID	12	0	12	12	12	0	0	0	0	0	0
04.1000	RECREATION & TOURISM	195.168-026	DIRECTOR, RECREATION	43	1	44	50	54	0	5	12	0	0	0
04.1900	TRANSPORTATION	019.188-010	TRAFFIC ENGINEER	16	1	16	16	17	0	1	0	0	0	0
07.0700	ENVIRONMENTAL HEALTH ASSISTANT	168.287-094	ENVIRONMENTAL HEALTH ASSISTANT	37	0	37	38	38	0	3	6	0	0	0
09.0001	CARE & GUID. OF CHILDREN	359.878-014	CHILD CARE ATTENDENT	574	9	588	592	600	286	296	304	0	0	0
14.0110	ENVIRONMENTAL-CONTROL TECH.	168.287-054	INDUSTRIAL WASTE INSPECTOR	13	0	13	13	13	0	1	3	0	0	0
14.0110	ENVIRONMENTAL CONTROL TECH.	955.782-018	SOLID WASTE TECH.	139	0	139	159	164	9	22	12	0	0	0
14.1001	AGR.-RELATED TECH.	168.287-010	AGR.-COMMODITY INSPECTOR	7	0	7	7	7	0	0	0	0	0	0
16.0700	HOME EC-RELATED TECH., OTHER	195.208-010	SOCIAL SERV. AID	163	5	185	193	206	9	10	17	0	0	0
17.2100	PUBLIC SERV. OCCUP.	168.168-010	BLDG. & SAFETY INSPECTOR	80	3	80	85	90	2	6	8	0	0	0
17.2001	FIREMAN TRAINING	373.884-014	FIREMAN	849	16	897	902	930	27	40	59	0	0	0
17.2002	LAW ENFORCEMENT TRAINING	375.268-030	POLICEMAN	939	13	982	1015	1030	47	64	80	0	0	0
	PUBLIC SERVICE OCCUPATIONS		TOTAL	2946	48	3074	3158	3244	381	455	510	0	0	0

Figure 3.3.6 Labor Demand - REPORT SIX

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

STATE CATEGORY TOTALS

TECHNICAL & CONSULTATIVE SERVICES OCCUPATIONS

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
16.0105	CHEMICAL TECHNICIAN	022.281-014	CHEMICAL TECHNICIAN	8	2	10	17	15	7	22	33	23	10	33	50
16.0106	CIVIL TECHNICIAN	005.181-010	CIVIL ENGINEERING TECH.	19	16	35	17	25	23	48	23	33	27	60	30
16.0107	ELECTRICAL TECH.	003.181-010	ELECTRICAL TECH.	2	0	2	5	2	1	3	5	5	4	9	12
16.0108	ELECTRONIC TECH.	003.181-014	ELECTRONIC TECH.	5	5	10	6	11	8	19	13	20	8	28	23
16.0109	ELECTROMECHANICAL TECHNICIAN	710.281-018	ELECTROMECHANICAL TECHNICIAN	0	0	0	0	0	0	0	0	0	0	0	0
16.0110	ENVIRONMENTAL CONTROL TECH.	168.287-054	INDUSTRIAL WASTE INSPECTOR	0	0	0	0	0	0	0	0	0	0	0	0
16.0110	ENVIRONMENTAL-CONTROL TECH.	955.782-018	SOLID WASTE TECH.	0	0	0	0	0	0	0	0	0	0	0	0
16.0112	INSTRUMENTATION TECHNICIAN	003.281-026	INSTRUMENTATION TECHNICIAN	6	10	16	14	10	14	24	23	16	15	31	37
16.0113	MECHANICAL TECH.	007.181-026	MECHANICAL ENGINEERING TECH.	4	3	7	10	4	3	7	10	5	5	10	13
16.0113	MECHANICAL TECH.	019.281-018	QUALITY CONTROL TECH	1	11	12	1	6	12	18	3	11	13	24	6
16.0699	MISC. TECH., OTHER	012.081-014	INDUSTRIAL SAFETY TECHNICIAN	0	0	0	0	0	0	0	0	0	2	2	0
16.0699	MISC. TECH., OTHER	029.281-018	LAB. FOOD TESTER	0	0	0	0	2	0	2	29	2	0	2	29
16.0699	MISC. TECH., OTHER	954.782-026	WASTE WATER TECH.	4	3	7	3	10	12	22	7	23	21	44	15
17.0701	COMMERCIAL ART OCCUPATIONS	970.381-046	SIGN PAINTER	0	1	1	0	0	0	0	0	0	0	0	0
17.0700	COMMERCIAL ART OCCUPATIONS	141.081-042	ILLUSTRATOR	2	2	4	50	2	0	2	50	2	0	2	50
17.0701	INTERIOR DECORATING	142.051-014	INTERIOR DECORATOR	0	0	0	0	0	0	0	0	0	0	0	0
TECHNICAL & CONSULTATIVE SERVICES OCCUPATIONS			TOTAL	51	53	104	7	87	80	167	12	140	105	245	15

Figure 3.3.7 Labor Demand - REPORT SEVEN

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LABOR DEMAND SURVEY
AREA 16 TOTALS

RETAIL AND WHOLESALE TRADE OCCUPATIONS

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	FULL TIME EMPL	CUR NO. VAC	ESTIMATED EMPLOYMENT 1973	1975	1977	REPLACEMENT NEEDS 73	75	77	IN PLANT TRAIN CUR NO. COMPLT. NO	75	77
04.0100	ADVERTISING SERVICES	164.068-010	ADVERTISING ASST.	14	0	14	14	14	2	2	3	0	0	0
04.0200	APPAREL AND ACCESS.	185.158-010	FASHION COORDINATOR	7	0	2	2	2	0	0	0	0	0	0
04.0200	APPAREL AND ACCESS.	263.358-038	SALESPRSN., FASHION ACCESSORIES	14	1	15	15	15	3	6	6	0	0	0
04.0200	APPAREL AND ACCESS.	263.358-046	SALESPRSN., MEN'S FURNISHINGS	17	0	16	16	16	0	2	3	0	0	0
04.0200	APPAREL AND ACCESS.	263.458-022	SALESPRSN., WOMEN'S GARMENTS	58	3	79	80	80	5	13	15	0	0	0
04.0400	FINANCE AND CREDIT	168.168-050	CREDIT & COLLECT. MGR.	4	0	4	4	4	0	1	0	0	0	0
04.0500	FLORISTRY	142.081-050	FLORAL DESIGNER	7	0	7	7	7	0	0	0	0	0	0
04.0500	FLORISTRY	260.458-010	SALESPRSN., FLOW. & FLOR. SUP.	1	0	1	1	1	0	0	0	0	0	0
04.0600	FOOD DISTRIBUTION	299.138-014	DEPT. HEAD, SUPRMKT.	89	3	99	110	130	14	19	24	0	0	0
04.0600	FOOD DISTRIBUTION	292.368-010	SALESMAN-DRIVER	6	0	6	6	6	0	0	0	0	0	0
04.0600	FOOD DISTRIBUTION	290.887-010	SALESPRSN., FOOD	32	0	32	34	34	3	6	6	0	0	0
04.0600	FOOD DISTRIBUTION	299.468-010	CASHIER-CHECKER	138	0	150	159	169	63	119	120	2	2	0
04.0800	GENERAL MDSE.	263.458-026	SALESPRSN., FABRICS & HM. SEW. SUPPLIES	19	1	20	20	20	2	4	4	0	0	0
04.0800	GENERAL MDSE.	289.458-014	SALESPRSN., GENERAL	87	3	91	98	99	14	15	18	0	0	0
04.0800	GENERAL MDSE.	185.168-058	RETAIL STORE MGR.	53	2	57	65	73	4	5	5	0	0	0
04.0800	GENERAL MDSE.	162.158-030	BUYER, ASST. BUYER	22	2	26	27	30	1	2	3	0	0	0
04.0900	HDWE., BLDG. MATER.	278.358-058	SALESPRSN., HDWE. & BLDG. SUP.	27	0	27	27	27	1	1	2	0	0	0
04.0900	HDWE., BLDG. MATER. FARM & GARDEN SUP. &	277.358-030	SALESPRSN., LAWN & GRDN. SUP.	6	1	6	6	6	1	1	1	0	0	0
04.1000	HOME FURNISHINGS	278.358-014	SALESPRSN., HOME FURNISHINGS	37	0	39	40	44	0	2	2	0	0	0
04.1200	INDUSTRIAL MARKETING	289.158-010	MFG.'S REP.	4	0	4	5	6	0	0	0	0	0	0

Figure 3.3.8 Labor Demand - REPORT EIGHT

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

AREA 1 CATEGORY TOTALS

AGRICULTURE PRODUCTION & SERVICES

TAXONOMY NUMBER	TAXONOMY TITLE	CCT NUMBER	CCT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
01.0100	AGR. PRODUCTION	421.883-010	FARM HAND, GENERAL	0	2	2	0	0	5	5	0	0	5	5	0
01.0101	ANIMAL SCIENCE	429.228-010	POULTRYMAN, TECH. ADVISOR	0	0	0	0	0	0	0	0	0	0	0	0
	AGRICULTURE PRODUCTION & SERVICES		TOTAL	0	2	2	0	0	5	5	0	0	5	5	0
	AREA 1 TOTALS			0	2	2	0	0	5	5	0	0	5	5	0

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

DOT LISTING

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
17.1007	PLUMBING & PIPEFITTING	862.381-042	PIPEFITTER	1	195	196	0	4	194	198	1	13	208	221	2
17.1007	PLUMBING & PIPEFITTING	862.381-074	PLUMBER	65	64	129	8	118	100	218	15	167	81	248	21
17.1099	CONSTRUCTION & MAIN. TRADES, OTHER	863.884-030	SIDING APPLICATOR	15	12	27	20	15	16	31	20	23	17	40	31
17.1099	CONSTRUCTION & MAIN. TRADES, OTHER	864.781-010	FLOOR LAYER	1	0	1	14	1	0	1	14	1	0	1	14
17.1009	GLAZING	865.781-010	GLAZIER	10	7	17	11	15	7	22	16	24	10	34	26
17.1010	ROOFING	866.381-010	ROOFER	44	125	169	8	80	145	225	15	114	140	254	21
17.1099	CONSTRUCTION & MAIN. TRADES, OTHER	884.884-014	CEMENT MASON	60	63	123	10	114	104	218	18	142	98	240	23
17.0102	HEATING	869.281-010	FURN. INSTALL. & REPAIR	15	23	38	5	31	34	65	10	45	46	91	15
17.1000	CONSTRUCTION & MAINTENANCE TRADES	899.381-010	BLDG. MAINTENANCE MAN	37	115	152	3	60	177	237	4	54	173	227	4
04.1900	TRANSPORTATION	905.883-014	TRACTOR-TRAILER TRUCK DRIVER	380	407	787	10	885	516	1401	24	1346	531	1877	36
04.1900	TRANSPORTATION	905.883-022	TRUCK DRIVER, HEAVY	78	232	310	4	241	356	597	12	339	339	678	16
04.1900	TRANSPORTATION	906.883-026	LIGHT-TRUCK DRIVER	130	290	420	5	316	369	685	13	492	388	880	20
04.1600	PETROLEUM	915.867-010	SERV. STA. ATTENDANT	26	193	219	3	54	230	284	5	101	280	381	10
04.1900	TRANSPORTATION	919.168-010	DISPATCHER, MOTOR VEHICLE	7	8	15	3	19	18	37	7	23	22	45	9
04.1900	TRANSPORTATION	922.883-018	INDUSTRIAL TRUCK OPERATOR	56	211	267	2	145	295	440	6	239	344	583	10
16.0699	MISC. TECH., OTHER	954.782-026	WASTE WATER TECH.	4	3	7	3	10	12	22	7	23	21	44	15
16.0110	ENVIRONMENTAL-CONTROL TECH.	955.782-018	SOLID WASTE TECH.	0	9	9	0	20	22	42	14	25	12	37	17
16.0108	ELECTRONIC TECH.	957.282-014	CONTROL ROOM TECH., RADIO & TV	0	2	2	0	1	6	7	1	6	11	17	3
17.0700	COMMERCIAL ART OCCUPATIONS	970.381-046	SIGN PAINTER	0	1	1	0	0	0	0	0	2	0	2	8

Figure 3.3.10 Labor Demand - REPORT TEN

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

DOT LISTING

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
01.0104	FARM BUSINESS MGMT.	405.168-010	MANAGER, FARM	2	0	2	2	3	0	3	3	3	0	3	3
01.0100	AGR. PRODUCTION	421.883-010	FARM HAND, GENERAL	40	80	120	3	58	119	177	5	70	136	206	6
01.0101	ANIMAL SCIENCE	429.228-010	POULTRYMAN, TECH ADVISOR	0	1	1	0	2	1	3	5	3	2	5	7

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LABOR DEMAND SURVEY

LABOR DEMAND ANALYSIS

DEMAND LISTING FOR 1973

TAXONOMY NUMBER	TAXONOMY TITLE	DOT NUMBER	DOT TITLE	1973 EXPN	1973 REPL	1973 TOTL NEED	1973 % CHG	1975 EXPN	1975 REPL	1975 TOTL NEED	1975 % CHG	1977 EXPN	1977 REPL	1977 TOTL NEED	1977 % CHG
17.1601	DRYCLEANING	369.884-026	CARPET & UPHOLSTERY CLEANER	0	0	0	0	0	0	0	0	0	0	0	0
16.0200	AGR.-RELATED TECH.	168.287-010	AGR.-COMMODITY INSPECTOR	0	0	0	0	0	0	0	0	0	0	0	0
04.0100	ADVERTISING SERVICES	165.068-022	PUBLIC REL. SPEC.	0	0	0	0	-3	2	-1	-7	0	2	2	0
07.0701	ENVIRONMENTAL HEALTH ASSISTANT	168.287-094	ENVIRONMENTAL HEALTH ASSISTANT	0	0	0	0	1	4	5	2	0	7	7	0
16.0110	ENVIRONMENTAL-CONTROL TECH.	168.287-054	INDUSTRIAL WASTE INSPECTOR	0	0	0	0	0	1	1	0	0	3	3	0
07.0901	ELECTROENCEPHALO-GRAPH TECH.	078.368-022	ELECTROENCEPHALO-GRAPH TECH.	0	0	0	0	0	5	5	0	2	0	2	9
04.1000	HOME FURNISHINGS	096.128-034	HM. FURNISH. ASST.	0	0	0	0	0	0	0	0	0	0	0	0
16.0399	HEALTH-RELATED TECH. OTHER	079.878-010	INDUSTRIAL HYGIENIST	0	0	0	0	0	0	0	0	0	0	0	0
17.0901	PHOTO. LAB. & DARK. OCCUPATIONS	976.381-010	DEVELOPER	0	0	0	0	5	0	5	14	0	0	0	0
01.0609	SOIL	040.081-074	SOIL CONSERV. AID	0	0	0	0	0	0	0	0	0	0	0	0
16.0699	MISC. TECH., OTHER	029.281-018	LAB. FOOD TESTER	0	0	0	0	2	0	2	8	0	0	0	0
04.1900	TRANSPORTATION	019.188-010	TRAFFIC ENGINEER	0	0	0	0	0	1	1	0	1	0	1	6
16.0108	ELECTRONIC TECH.	828.281-022	ELECTRONICS MECH.	0	0	0	0	0	0	0	0	0	1	1	0
16.0699	MISC. TECH., OTHER	729.281-010	EDUCATIONAL MEDIA TECHNICIAN	0	0	0	0	0	0	0	0	5	0	5	71
17.2101	INSTRUMENTS	710.281-058	INSTRUMENT REPAIRMAN	0	0	0	0	0	0	0	0	0	0	0	0
17.1599	ELECTRONICS OCCUP., OTHER	184.168-022	PROGRAM DIRECTOR, RADIO & TV	-1	0	-1	-2	4	2	6	10	0	2	2	0
04.1900	TRANSPORTATION	255.258-010	TRAFFIC AGENT	-2	1	-1	-2	8	8	11	3	0	3	3	0
09.0204	HOME FURNISH., EQUIP. AND SERV.	278.258-010	HOME SERV. REP.	-2	0	-2	-9	0	0	0	0	0	0	0	0
04.1200	INDUSTRIAL MARKETING	289.158-010	SALES MGR., INDUS.	-4	1	-3	-2	12	11	23	5	15	9	24	6

Figure 3.3.11 Labor Demand - Demand Listing

3.4 Use of Computer Software in Report Generation

Every effort has been made in software development operations, to simplify the process of report generation. Table 3.2.1 contains a list of available operands for use in communications within the program. These operands, modifying the command EXECUTE, will allow the user to specify his desire for all, or any part, of the report types. The only restrictions in usage is that the LABEL FILE must be created before any reports can be generated, and the DEMAND FILE must be formed before demand listings can be obtained. It is important, and we reemphasize, that multiple computer runs can be made, with some subset of the reports generated in each run; or a single run can be made with all reports produced in the one run. An example of a complete user specification for a labor demand analysis, with an extraneous listing of file FT20F001, is shown below:

```
LABOR DEMAND

        EXECUTE  LABEL FILE
        EXECUTE  REPORT ONE
        EXECUTE  REPORT TWO
        EXECUTE  REPORT THREE
        EXECUTE  REPORT FOUR
        EXECUTE  REPORT FIVE
        EXECUTE  REPORT SIX
        EXECUTE  REPORT SEVEN
        EXECUTE  REPORT EIGHT
        EXECUTE  REPORT NINE
        EXECUTE  REPORT TEN
```

LABOR DEMAND (Cont.)

```
EXECUTE  DEMAND FILE
LIST     FT20F001
EXECUTE  REPORT ELEVEN
EXECUTE  REPORT TWELVE
EXECUTE  REPORT THIRTEEN
```

CHAPTER 4

CENIS STUDENT INTEREST COMPONENT

4.1 Student Interest - Data Collection and Entry

4.1.1 Overview of Data Collection Operations

The Student Interest Component of CENIS furnishes an inventory of careers which interest high school juniors and seniors, and estimates the number of students who will enter each career. Students who plan to enter the military service upon graduating from high school are excluded from some of the reports. This restriction assures that estimates of interests in specific occupations are consistent with the number available to enter.

The source data for the analysis is the set of eleventh and twelfth grade students in selected high schools. In all the merged areas, except the Des Moines area, schools are selected using a simple random sampling plan. Schools outside the Des Moines Metropolitan Area are selected using the plan described above whereas all schools in the metropolitan area are included in the analysis. The latter group is surveyed using a different instrument than that used for the rest of the state.

Students surveyed outside the Des Moines Metropolitan Area are asked to indicate the two most preferred careers in the order of interest and to estimate the degree of certainty they will enter their first choice. In addition each student is asked what he plans to do upon graduating from high school. Weights associated with the sampling plan in each merged area are used to project the sample to population totals in each merged area. Similarly, a probability associated with the certainty of choice is used to allocate the sample and population totals to the First Choice and the Second Choice careers mentioned by the student.

Each career mentioned by the student is associated with a particular Taxonomy-DOT classification in all reports, and an integral part of the data analysis for the Student Interest Survey is the file that establishes the correspondence between the occupational choices of the student and the standard DOT codes. The Des Moines Metropolitan Area survey uses a different set of career identifying codes than those for the regular survey. However, the details as to how this difference is resolved can best be exhibited in the description of the processes involved in the analysis of the data.

Since the data collected in the Des Moines Metropolitan Area are sufficiently different in the way in which they enter the system, the term Scout data will be used to distinguish these from the regular sample data which will also be referred to as Questionnaire data. The "Chronological" sequence of processing the Student Interest data is arbitrarily sequenced so that the regular survey method is introduced first and the Scout data second. Outside the data processing sequence described herein, the collection of the two sets of data may be a simultaneous and a somewhat independent process.

4.1.2 Data Collection by Questionnaire

A packet of survey materials are sent to each high school designated by the survey plan so that each student in the eleventh and twelfth grades has two pre-printed forms available at the time he fills out the Career Interests form. Arrangements are made so that a member of the high school staff receives the packet, distributes a copy of each form to the students, collects the forms after they are handled by the students and

returns them to the Career Education Division of the Department of Public Instruction.

One of the forms received by the student is a condensed list, as shown in Figure 4.1.1, of occupations arranged in general categories such as Construction Occupations, Health Occupations, etc. Associated with each occupation is a three-digit code unique to the occupation in each general area. For example, in the survey conducted in 1973, the occupation of Cashier had the code G06 in the Business and Office Occupation group.

The second form, shown as Figure 4.1.2, received by the student is the Student Interest Survey form. The instructions to the student ask him to do these things:

1. List two occupations, by code letter and numbers, in which you plan or expect to be employed after completing your schooling.
2. Indicate how sure you are of entering your first choice occupation.
3. Indicate what your immediate plans after high school are expected to be.

Further information, associated with each survey form, include numeric codes for County, District, School, Area and Grade. Inasmuch as the occupational list is not exhaustive, the opportunity for the student to include occupations which are not on the list is provided. Write-in occupations are reviewed by the Career Education Division and new occupation categories are added to the list and codes assigned so that the code on the survey form accurately reflects the students' choice.

A second list is established by the Career Education Division which equates each code used in the regular survey with a standard Taxonomy-DOT classification entry. This table must contain all occupations used in the

Figure 4.1.1 Student Interest Occupational List

AGRICULTURE AND CONSERVATION OCCUPATIONS

A01 General agriculture or conservation worker
A02 General, livestock, or crop farmer
A03 Farm manager
A04 Feed mill elevator operator
A05 Grain and feed products salesman or buyer
A06 Farm implement or garden equipment salesman
A07 Farm equipment mechanic
A08 Farm machinery set-up man
A09 Animal husbandrymen
A10 Poultrymen
A11 Seed analyst
A12 Agronomist
A13 Forester
A14 Nurseryman
A15 Landscaper
A16 Groundskeeper
A17 Horticulturist or florist
A18 Park ranger or foreman
A19 Wildlife gamekeeper
A20 Conservation officer
A21 Exterminator
A22 Soil conservation aid
A23 Extension agent
A24 Veterinarian
A25 Veterinary assistant or technician
A99 Other, specify

CONSTRUCTION OCCUPATIONS

B01 Construction worker
B02 Carpenter
B03 Painter
B04 Bricklayer or mason
B05 Building contractor
B06 Building materials dealer, salesman, or yardsman
B07 Cost estimator
B08 Building inspector
B09 Civil engineering technician
B10 Earth moving equipment operator
B11 Electrician or lineman
B12 Plumber or pipefitter
B13 Sheet metal worker
B14 Structural steel worker
B15 Construction welder
B16 Architect
B17 Architectural draftsman
B99 Other, specify

SALES OCCUPATIONS

C01 General sales worker
C02 Buyer or merchandiser
C03 Industrial sales manager
C04 Retail store manager
C05 Advertising assistant
C06 Sales or grocery store checker or cashier
C07 Supermarket department head
C08 Clothes and accessories salesperson
C09 Fabric and sewing supplies salesperson
C10 Home furnishings salesperson
C11 Sporting goods salesperson
C12 Lawn and garden supplies salesperson
C13 Hardware salesperson
C14 Insurance salesman
C15 Real estate salesman
C99 Other, specify

MEDIA, ART, AND ENTERTAINMENT OCCUPATIONS

D01 Designer or entertainer
D02 Journalist
D03 Author or writer
D04 Editor
D05 Publisher
D06 Bookbinder
D07 Print shop foreman
D08 Printing pressman
D09 Typesetter
D10 Photographer
D11 Photographic assistant
D12 Photographic darkroom technician
D13 Fashion or photographer's model
D14 Fashion designer
D15 Displayman
D16 Illustrator or layout man
D17 Sign painter
D18 Artist
D19 Floral designer
D20 Industrial or product designer
D21 Actress or actor
D22 Dramatic or theater artist
D23 Dancer or performer
D24 Drama coach or director
D25 Professional musician or singer
D26 Professional athlete
D27 Radio or TV announcer
D28 Radio or TV program director
D29 Radio or TV control room technician
D30 Radio or TV equipment operator
D31 Radio or TV reporter
D99 Other, specify

MAINTENANCE AND REPAIR OCCUPATIONS

E01 Maintenance and repair worker
E02 Air conditioning or refrigeration mechanic
E03 Industrial maintenance mechanic
E04 Building maintenance man
E05 Electric motor repairman
E06 Electronics mechanic or technician
E07 Radio or TV serviceman
E08 Gas or electric appliance serviceman
E09 Maintenance electrician
E10 Instrument or watch repairman
E11 Musical instrument repairman
E12 Office machine repairman
E13 Repair welder
E99 Other, specify

FOOD SERVICE AND LODGING OCCUPATIONS

F01 Food service or lodging worker
F02 Bellman
F03 Caterer
F04 Cook or baker
F05 Kitchen helper
F06 Kitchen supervisor
F07 Meat cutter or butcher
F08 Food technologist
F09 Restaurant hostess
F10 Restaurant manager
F11 Waiter or waitress
F12 Custodian
F13 Housekeeper
F14 Hotel or motel manager
F99 Other, specify

BUSINESS AND OFFICE OCCUPATIONS

G01 Business and office worker
G02 Business administrator
G03 Business manager
G04 Banker
G05 Teller
G06 Cashier
G07 Loan officer
G08 Account executive
G09 Accounting technician
G10 Finance expert
G11 Certified public accountant
G12 Bookkeeper
G13 Claims adjuster
G14 Clerk-typist
G15 General office clerk
G16 Receptionist
G17 Switchboard operator
G18 General secretary
G19 Legal secretary
G20 Medical secretary
G21 Stenographer
G22 Key-punch operator
G23 Computer programmer
G24 Computer systems analyst
G25 Shipping and receiving clerk
G26 Office machine operator
G27 Office supervisor
G28 Personnel director
G29 Public relations specialist
G30 Industrial relations director
G31 Market research analyst
G32 Survey worker
G33 Credit and collection manager
G99 Other, specify

MANUFACTURING OCCUPATIONS

H01 Factory worker
H02 Foundry molding machine operator
H03 Foundry metal patternmaker
H04 Mechanical draftsman
H05 Tool and die maker
H06 General machinist
H07 Machine tool set-up operator
H08 Numerical control machine operator
H09 Numerical control tool programmer
H10 Electrical discharge machine operator
H11 Stamp or punch press operator
H12 Metallurgical assistant
H13 Quality control technician
H14 Job or time study analyst
H15 Fluid-power technician
H16 Industrial safety technician
H17 Industrial waste inspector
H18 Plastics molding machine operator
H19 Cabinetmaker
H20 Woodworking machine operator
H21 Electrical or electronics technician
H22 Electromechanical technician
H23 Engineering technician
H24 Forklift truck operator
H25 General inspector
H26 Leatherworker
H27 Sewing machine operator
H28 Combination arc and gas welder
H29 Electric arc welder
H30 Inert gas welder
H31 Oxyacetylene welder
H32 Cutting torch operator
H99 Other, specify

HEALTH OCCUPATIONS

J01 Hospital or health worker
J02 Dental assistant or technician
J03 Dental hygienist
J04 Dentist
J05 Medical doctor, physician, or surgeon
J06 Physician's assistant
J07 Chiropractor
J08 Osteopath
J09 Orthodontist
J10 Medical laboratory technician or assistant
J11 Medical record technician
J12 Nuclear medical technologist
J13 Ambulance attendant
J14 Hospital orderly
J15 Nurse's aid
J16 General nurse
J17 Licensed practical nurse
J18 Registered professional nurse
J19 Electrocardiograph technician
J20 Electroencephalograph technician
J21 Cytotechnologist
J22 Operating room technician
J23 Inhalation therapist
J24 Physical therapist
J25 Physical therapy attendant
J26 Mental health technician
J27 Home health aid
J28 Dietician
J29 Dietetic technician
J30 Optometrist
J31 Optical assistant
J32 Physiologist
J33 Psychiatrist
J34 Psychologist
J35 Pathologist
J36 X-ray technician
J99 Other, specify
J37 Occupational therapy aide
J38 Medical technician

TRANSPORTATION RELATED OCCUPATIONS

J01 General mechanic
J02 Service station attendant
J03 Automobile garage mechanic
J04 Automobile body and fender repairman
J05 Automobile painter
J06 Automobile parts counterman
J07 Automobile salesman
J08 Diesel mechanic
J09 Hydraulic or fluid power mechanic
J10 Aircraft and engine mechanic
J11 Airline stewardess
J12 Airline reservationist
J13 Airplane pilot
J14 Flight engineer or navigator
J15 Ground control operations specialist
J16 Railroad trainman
J17 Railroad agent
J18 Small gas engine repairman
J19 Motorcycle repairman
J20 Bicycle repairman
J21 Light truck driver
J22 Tractor trailer truck driver
J23 Traffic engineer
J24 Motor vehicle dispatcher
J25 Tire retreader
J99 Other, specify

GENERAL SERVICE OCCUPATIONS

K01 Private or public service worker
K02 Community or social services worker
K03 Social services director
K04 Clergyman
K05 Church or religious worker
K06 Homemaker
K07 Home economist
K08 Home furnishings assistant
K09 Home service representative
K10 Child care attendant
K11 Recreation director
K12 Elementary school teacher
K13 Secondary school teacher
K14 Special education teacher
K15 School teacher's aid
K16 School counselor
K17 School administrator
K18 College instructor
K19 Librarian
K20 Interviewer
K21 Foreign language interpreter
K22 Diplomat or foreign service worker
K23 Government official
K24 Lawyer, attorney, or judge
K25 Court reporter
K26 Military officer or career serviceman
K27 Temporary military serviceman or woman
K28 Policeman, policewoman, or highway patrolman
K29 Fireman
K30 Watchman or guard
K31 Mail carrier or post office worker
K32 Sanitarian worker
K33 Barber
K34 Cosmetologist or beautician
K35 Masseur or masseuse
K36 Bartender
K37 Dressmaker or tailor
K38 Clothing maintenance specialist
K39 Fashion coordinator
K40 Interior designer or decorator
K41 Upholsterer
K42 Carpet and linoleum layer
K43 Carpet and upholstery cleaner
K44 Dry cleaner or launderer
K45 Laundry steam press operator
K46 Janitor
K47 Urban planner
K48 Funeral director or undertaker
K49 Building and safety inspector
K50 Food and drug inspector
K51 Solid waste technician
K52 Speech clinician
K53 Politician
K54 Auctioneer
K99 Other, specify

SCIENTIFIC OCCUPATIONS

L01 Scientist or engineer
L02 Archaeologist
L03 Anthropologist
L04 Astronomer
L05 Bacteriologist
L06 Biologist
L07 Botanist
L08 Cartographer
L09 Chemist
L10 Economist
L11 Aeronautical engineer
L12 Ceramic engineer
L13 Chemical engineer
L14 Civil engineer
L15 Electrical engineer
L16 Industrial engineer
L17 Mechanical engineer
L18 Sanitary engineer
L19 Geophysicist
L20 Geologist
L21 Meteorologist
L22 Jeweler
L23 Mathematician
L24 Actuary
L25 Oceanographer
L26 Pharmacist
L27 Philosopher
L28 Historian
L29 Physicist
L30 Political scientist
L31 Research analyst
L32 Sociologist
L33 Zoologist
L99 Other, specify

Figure 4.1.2 Student Interest Survey Form

CE-13

State of Iowa
DEPARTMENT OF PUBLIC INSTRUCTION
Career Education Division
Des Moines, Iowa 50319

Dear High School Junior or Senior:

The Career Education Division of the Iowa Department of Public Instruction, in cooperation with your high school, is undertaking a survey to find out your career interests. Knowledge of your interests will help in the planning of future career education programs both at the high school and post-high school level.

Lists of occupations, organized and coded into groups, have been attached for you to review. They are printed on both sides of the attached sheet.

On the form below, please do these things:

1. List two occupations, by code letter and numbers, in which you plan or expect to be employed after completing your schooling.

2. Indicate how sure you are of entering your first choice occupation.

3. Indicate what your immediate plans following high school are expected to be.

When you have finished, please hand in this sheet. You may keep the occupational lists.

* *

STUDENT INTEREST SURVEY

Instructions: After putting appropriate numbers in the top row of boxes, indicate your occupational choices by a letter (major group) and two numbers (specific occupation within group). For occupations numbered 99 (other), write titles on bottom lines. Indicate certainty of first choice and immediate plans after high school with a check (✓) or "X" in the appropriate box. If you have any questions, please ask for assistance.

(1-14) [ ][ ] County [ ][ ][ ][ ] District [ ][ ][ ][ ] School [ ][ ] Area [ ][ ] Grade

Occupational Choices:

(15-17) [ ][ ][ ] 1st Choice

(18-20) [ ][ ][ ] 2nd Choice

Certainty of First Choice:

(21)

1 [ ] Very Sure of Decision

2 [ ] Fairly Sure of Decision

3 [ ] Not Sure of Decision

Immediate Plans after High School:

(22)

1 [ ] Full-time Employment

2 [ ] Military Service

3 [ ] Less than 4 year College

4 [ ] 4 Year College/University

5 [ ] None of These

Choices Numbered 99:

_____
Specific Occupational Title

_____
Specific Occupational Title

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Figure 4.1.3 Student Interest DOT Code Conversion Table

x. No.	Taxonomy Title	DOT No.	SIS Code	DOT Title
.01	Agricultural Production	400.000-000	A01	General Agriculture
.0101	Animal Science	040.081-018	A09	Animal Husbandryman
.0601	Forests	040.081-038	A13	Forester
.00	Agricultural Science	040.081-014	A12	Agronomist
.0504	Landscaping	407.884-010	A16	Groundskeeper
.05	Ornamental Horticulture	040.081-046	A17	Horticulturalist
.0604	Wildlife	451.181-010	A19	Wildlife Gamekeeper
.06	Agricultural Resources	379.168-018	A20	Conservation Officer
.0104	Farm Business Management	096.128-014	A23	Extension Agent
.00	Animal Science	073.108-014	A24	Veterinarian
.10	Construction Trades	860.000-000	B01	Construction Worker
.00	Construction Trades	182.168-010	B05	Building Contractor
.09	Hardware, Bldg. Materials, etc.	276.358-010	B06	Bldg. Materials Salesman
.2306	Welding	819.381-022	B15	Construction Welder
.00	Architectural Design	001.081-010	B16	Architect
.00	Art/Media	152.000-000	D01	Designer/Entertainer
.00	Media	132.268-018	D02	Journalist
.00	Media	130.088-014	D03	Author/Writer
.00	Media	132.068-034	D04	Editor
.00	Media	132.068-014	D05	Publisher
.1901	Composition, Makeup, & Typesetting	973.381-010	D09	Typesetter
.00	Art	961.868-018	D13	Fashion/Photo Model
.00	Art	142.081-018	D14	Fashion Designer
.00	Art	970.381-042	D18	Artist/Painter

Tax. No.	Taxonomy Title	DOT No.	SIS Code	DOT Title
34.00	Entertainment	150.048-010	D21	Actress/Actor
34.00	"	150.048-014	D22	Dramatic Artist
34.00	"	151.048-010	D23	Dancer/Performer
34.00	"	150.028-014	D24	Drama Coach
34.00	"	152.048-026	D25	Prof. Musician/Singer
34.00	"	153.348-010	D26	Prof. Athlete
34.00	Media	143.062-010	D30	Radio-TV Equip. Operator
34.00	Media	132.268-010	D31	Radio-TV Reporter
17.10	Construction and Maintenance Trades	899.281-018	E01	Maintenance Worker
04.02	Apparel and Accessories	263.358-000	C08	Clothes/Access. Salesperson
17.29	Quantity Food Occupations	310.000-000	F01	Food Service Worker
17.29	Quantity Food Occupations	318.887-010	F01	Kitchen Helper
14.00	Office Occupations	210.000-000	G01	Business Worker
37.00	Business	160.168-014	G02	Business Administrator
04.12	Industrial Marketing	189.188-018	G03	Business Manager
37.00	Business	186.168-010	G04	Banker
37.00	"	020.188-018	G10	Finance Expert
37.00	"	160.188-010	G11	Certified Public Accountant
04.13	Insurance	241.168-010	G13	Claims Adjuster
14.0603	Personnel Assistants	166.118-022	G28	Personnel Director
14.0603	"	166.118-014	G30	Ind. Relations Director
17.0000	Trade & Industrial Occupations	600.000-000	H01	Factory Worker
38.00	Manufacturing	012.188-010	H14	Job/Time Study Analyst
07.0000	Health Occupations	070.000-000	I01	Hospital/Health Worker

ax. No.	Taxonomy Title	DOT No.	SIS Code	DOT Title
9.00	Health	072.108-010	I04	Dentist
9.00	"	070.108-026	I05	Medical Doctor
9.00	"	079.108-014	I07	Chiropractor
9.00	"	071.108-010	I08	Osteopath
9.00	"	072.108-014	I09	Orthodontist
4.0499	Information Communication	249.388-034	I11	Med. Record Tech.
7.0303	Nursing Assistance	355.878-038	I14	Hospital Orderly
9.00	Health	075.378-014	I18	Reg. Prof. Nurse
9.00	"	079.378-034	I24	Physical Therapist
9.00	"	077.168-014	I28	Dietician
9.00	"	079.108-026	I30	Optometrist
39.00	"	041.081-118	I32	Physiologist
39.00	"	070.108-082	I33	Psychiatrist
39.00	"	045.088-010	I34	Psychologist
39.00	"	070.081-010	I35	Pathologist
04.19	Transportation	352.878-010	J11	Airline Stewardess
04.19	"	912.368-022	J12	Airline Reservationist
16.0101	Commercial Pilot Training	196.283-014	J13	Airplane Pilot
40.00	Transportation	932.884-010	J16	Railroad Trainman
40.00	"	910.138-030	J17	Railroad Agent
40.00	"	559.885-282	J25	Tire Recapper
41.00	Public/Private Services	195.108-010	K02	Comm./Soc. Serv. Worker
41.00	"	195.168-014	K03	Social Services Director
41.00	"	120.108-010	K04	Clergyman
41.00	"	129.208-010	K05	Church/Religious Worker

Tax. No.	Taxonomy Title	DOT No.	SIS Code	DOT Title
41.00	Personal Services	306.878-010	K06	Homemaker
41.00	"	096.128-030	K07	Home Economist
41.00	Public/Private Services	092.228-010	K12	Elem. School Teacher
41.00	"	091.228-018	K13	Sec. School Teacher
41.00	"	094.228-026	K14	Spec. Educ. Teacher
14.0601	Educational Assistant	092.228-018	K15	School Teachers' Aide
41.00	Public/Private Services	045.108-010	K16	School Counselor
41.00	"	091.118-014	K17	School Administrator
41.00	"	090.228-010	K18	College Instructor
41.00	"	100.168-026	K19	Librarian
41.00	"	137.268-010	K21	Foreign Lang. Interpreter
41.00	Foreign Services	188.118-058	K22	Diplomat/Foreign Service
41.00	Public Services	168.168-098	K23	Government Official
41.00	Personal Services	110.108-010	K24	Lawyer/Attorney/Judge
41.00	"	202.388-010	K25	Court Reporter
41.00	"	368.999-010	K26	Military Serviceman
41.00	"	368.999-014	K27	Temp. Military Serv.
41.00	Public/Private Services	372.868-054	K30	Watchman or Guard
41.00	"	300.000-000	K01	Private/Public Service
14.0403	Mail/Postal Clerks	233.388-010	K31	Mail Carrier
41.00	Public Services	168.287-094	K32	Sanitarian Worker
41.00	Public/Private Services	312.878-014	K36	Bartender
17.33	Textile Production	785.361-014	K37	Dressmaker/Tailor
41.00	Public Services	199.168-014	K47	Urban Planner
41.00	Personal Services	187.168-026	K48	Funeral Director

Tax. No.	Taxonomy Title	DOT Number	SIS Code	DOT Title
51.00	Public Services	168.287-042	K50	Food/Drug Inspector
51.00	"	079.108-034	K52	Speech Clinician
41.00	"	051.088-018	K53	Politician
04.08	General Merchandise	294.258-010	K54	Auctioneer
42.00	Science/Engineering	010.000-000	L01	Scientist/Engineer
42.00	Natural Science	055.088-018	L02	Archaeologist
42.00	Social Science	055.088-010	L03	Anthropologist
42.00	Natural Science	021.088-010	L04	Astronomer
42.00	"	041.081-010	L05	Bacteriologist
42.00	"	041.081-034	L06	Biologist
42.00	"	041.081-042	L07	Botanist
42.00	"	017.281-058	L08	Cartographer
42.00	"	022.081-054	L09	Chemist
42.00	Social Service	050.088-014	L10	Economist
42.00	Engineering	002.081-014	L11	Aeronautical Engineer
42.00	"	006.081-010	L12	Ceramic Engineer
42.00	"	008.081-014	L13	Chemical Engineer
42.00	"	005.081-014	L14	Civil Engineer
42.00	"	003.081-018	L15	Electricial Engineer
42.00	"	012.188-030	L16	Industrial Engineer
42.00	"	007.081-038	L17	Mechanical Engineer
42.00	"	005.081-046	L18	Sanitary Engineer
42.00	Natural Science	024.081-038	L19	Geophysicist
42.00	"	024.081-018	L20	Geologist
42.00	"	025.088-014	L21	Meteorologist

Tax. No.	Taxonomy Title	DOT No.	SIS Code	DOT Title
42.00	Engineering	700.281-010	L22	Jeweler
42.00	Natural Science	020.088-018	L23	Mathematician
42.00	"	020.188-010	L24	Actuary
42.00	"	024.081-054	L25	Oceanographer
42.00	"	074.181-010	L26	Pharmacist
42.00	Social Science	054.088-046	L27	Philosopher
42.00	"	052.088-018	L28	Historian
42.00	Natural Science	023.081-010	L29	Physicist
42.00	Social Science	051-088-018	L30	Political Scientist
42.00	"	020.088-022	L31	Research Analyst
42.00	"	054.088-038	L32	Sociologist
42.00	"	041.081-154	L33	Zoologist

regular survey as well as those used in the Scout survey. These data constitute the entries in the DOT table which is used in the Student Interest data processing. There is no restriction on the content of the alphabetical character sets used for any of the Taxonomy or DOT titles except in regard to print space available. However, the seven-digit taxonomy number and the eleven digit DOT number must be the appropriate numbers since the results of the Student Interest forms are used in the Interface Reports of the CENIS system.

Data card preparation for the regular survey consist of punching the data reported on the Student Interest Survey form in the format displayed in Table 4.1.1.

4.1.3 DOT Table - Structure and Use

The three-digit code, and abridged career description or occupation title, used for the convenience of the student and people involved in handling the questionnaires must be further processed so that occupation titles are meaningful and that Taxonomy-DOT codes appearing on Student Interest Reports are the same as those used elsewhere in the CENIS system. To do this, two data cards must be prepared, according to the specifications in Table 4.1.2, for each career that appears on the questionnaires. Later in the text, in the section which deals with the Scout data, instructions are given to assign each five-digit career code the appropriate three-digit code used in the survey. Therefore, table entries must be prepared for occupations appearing in either collection.

Table 4.1.1 Data Card Format

Card Column	Contents
1-2	County
3-6	District
7-10	School
11-12	Area
13-14	Grade
* 15-17	Occupational Code of 1st Choice
18-20	Occupational Code of 2nd Choice
21	Certainty of 1st Choice
22	Future plans

* The data provided in Columns 1 through 14 are the standard numeric codes established by the Department of Public Instruction for County, District, etc. The data in Columns 15 through 22 are coded as follows:

1. Occupation Choice - a three-digit code consisting of a code letter followed by a two-digit code number taken from the occupation list furnished the student.
2. Certainty - punched 1 for Very Sure
   2 for Fairly Sure
   3 for Not Sure.
3. Future Plans - punched 1 for Full Time Employment
   2 for Military Service
   3 for Less Than Four-Year College
   4 for Four-Year College/University
   5 for None of the Above
   6 for Not Specified

Table 4.1.2 DOT Table for Student Interest

Card Column		Contents
1		Card Number, Coded 1 or 2
2-4		Student Interests' 3-digit Occupation Code
5-11, Card 1	*	CENIS Taxonomy Number
12-66, Card 1	**	Taxonomy Title
5-15, Card 2	*	CENIS DOT Number
16-74, Card 2	**	DOT Title

* The Code used here must be the standard code for Taxonomy and DOT and will be used in the Interface Reports.

** Abridged Taxonomy and DOT titles are preferred since print space on some of the Student Interest Reports restricts the Taxonomy title to twelve characters and the DOT title to twelve characters.

4.1.4 Data Collection for the Scout System

Arrangements have been made with the Boy Scout Organization in Des Moines to contact each junior and senior high school student in a subset of the high schools in the merged area that includes Des Moines. The data collected by the Scout organization includes first and second choice career interests using a unique occupation list and occupation code. These data do not, however, contain any information about the certainty factor or future plans.

In addition to the above, the Boy Scout Organization has made arrangements with a private data processing firm to analyze the data collected by the Scouts. With little additional work, the summary card (one for each occupation recorded by the Scouts) produced by the firm can be coded to enter grade-by-choice information into the Student Interest System. Table 4.1.3 shows the layout and content of the Scout-type summary card.

Table 4.1.3 Scout-Type Summary Card

Card Columns	Contents
1-3 *	Three-digit Student Interests Occupation Code
4 *	Future Plans Code 6 for "Not Specified"
5-6 *	Merged Area Code of "11"
11-15	Five-digit Scout-Type Occupation Code
16-19	Count of Eleventh Grade - First Choice
20-23	Count of Twelfth Grade - First Choice
24-28	Total First Choice for This Occupation

Card Columns	Contents
34-37	Count of Eleventh Grade - Second Choice
38-41	Count of Twelfth Grade - Second Choice
42-46	Total Second Choice for This Occupation
52-57	Total of First and Second Choices for This Occupation

* These numbers are not on the card when it is received from the firm. Each five-digit code must be assigned a three-digit Student Interest Code as used in the survey.

4.2 Student Interest Data Analysis and Report Generation Software

4.2.1 System Operations - General

At this point, it is instructive to introduce the flow chart of the Student Interests System so that all the processes can be viewed as a system and also to allow further discussion of the parts in an orderly manner.

Assuming that Phase I of the Student Interest System includes all the work up to and including the punching of the computer cards described in Tables 4.1.1-4.1.3, then Phase II can be thought of as all subsequent computer runs which use the Phase I data files. Consequently, the following five steps exhibit the flow chart concept of the Student Interest System:

Phase II a. This step creates a computer data file from the survey data prepared according to the specifications in Table 4.1.1.

Phase II b. This step sorts the data file from II a. above so that the data are organized jointly by Merged Area, Occupational Choice and Future Plans.

Phase II c. This step incorporates the questionnaire data and Scout data and creates a summary-type data file.

Phase II d. This step sorts the file from step II c. so that the data are sequenced by DOT number within Taxonomy number.

Phase II e. This step produces all the printed reports from the Student Interest System as well as the computer record for the Interface System of CENIS.

It is evident that the programs (steps) in Phase II are modular and that the chronological process is in alphabetical sequence, a to e. Steps II-a through II-d are dependent on the availability and accuracy of the data discussed in Tables 4.1.1-4.1.3. For example, in step II-a each occupational choice is checked against the DOT table to insure that the three-digit code is defined, that only grades eleven and twelve are recorded, etc. in the survey data. A check is made in step II-c to see that the three-digit code affixed to the Scout data card is also defined in the DOT table. In this step, the check is made on the Scout data cards prior to summarizing the survey data so that any unresolved code will be detected and further processing be stopped at the appropriate time.

In the checking process in step II-a, and that for the Scout data in step II-c, the program prints a message regarding any unresolved checks and proceeds to check the rest of the file being examined so that, if they exist, other errors might be detected. However, both programs generate a signal to stop further processing if an error is encountered. In addition, the program in step II-a punches a card identical to the one found to be in error so that corrections can be made quickly and included in the next running of this step. All cards found which pass the editing process are processed so only problem cases need to be handled again.

Student Interest Reports are generated in step II-e. This step presupposes the successful completion of the first four steps as well as some further information defining weights and merged areas for which reports are desired. To this effect, one must specify: population totals for each merged area surveyed by the regular method; population totals for each merged area surveyed by the Scout method; weights by area for each

survey method; the merged areas for which reports are desired; and (optionally) weights for each method.

One of the options of the system is to run Phase II-e for the purpose of computing weights—in this case, the weights computed are punched in the correct format, described in Table 4.2.3, so that they can readily be modified if the user so desires. Population totals must be entered, see Table 4.2.1, and a card specifying the type of run (compute weights only or compute final reports for the merged areas specified) is prepared according to Table 4.2.2. In practice, a weights-only run is strongly recommended as the first run so that the percentages computed for future plans of "Less Than Four-Year College" and "Full Time Employment" are available to enter as specified in Table 4.2.3.

Table 4.2.1 Population Totals of Eleventh and Twelfth Grade Students

* Card Columns	Contents
1-6, First Card	Total of students in the schools sampled in Merged Area 1
7-12, First Card	Total of students in the schools sampled in Merged Area 2
73-78, First Card	Total of students in the schools sampled in Merged Area 13
1-6, Second Card	Total of students in the schools sampled in Merged Area 14
7-12, Second Card	Total of students in the schools sampled in Merged Area 15
13-18, Second Card	Total of students in the schools sampled in Merged Area 16
19-24, Second Card	State total of all schools sampled

* The third and fourth card is prepared in identical fashion and the totals are restricted to the number of students in the schools surveyed by the Scout method—normally card 3 contains a non-zero number in Columns 61-66, card 3 for merged area 11 and this same total in Columns 19-24, card 4 for the state total of students in the schools surveyed by the Scout method.

Table 4.2.2 Report Selection for Weights Only on Area Reports

Card Columns	Content
1-48	Comments such as "Compute Reports for the specified merged areas...."
49-50 *	The Merged Area Number of the first area for which reports are desired
50-52 *	The Merged Area Number of the second area for which reports are desired
79-80 *	The Merged Area Number of the sixteenth area for which reports are desired

* If all sixteen fields are blank or contain zeros, then only Student Interest Reports 1, 2, and 3 will be produced—see text for a discussion of Student Interest Reports.

Table 4.2.3 Weights and Percentages

* Card Columns	Content
17-18	Merged Area Number, 1-16
22-30	Weight or projection factor for the survey data
31-39	Weight or projection factor for the Scout data
40-49	Percentage in the merged area with Future Plans of Less than Four-Year College
50-59	Percentage in the state with Future Plans of Less than Four-Year College
60-69	Percentage in the merged area with Future Plans of Full-time Employment
70-79	Percentage in the state with Future Plans of Full-time Employment

* This data file, 16 cards, must be included and in merged area sequence on all runs specifying reports for specific merged areas. The weights and percentage cards are ignored if they are present when a weights-only, type 1, run is specified.

4.2.2 Component Programs

The five file-handling or computational steps described as steps II-a through II-e are also described as computational steps in the CENIS system. Tables 4.2.3 and 4.2.4 establish the correspondence between steps and CENIS routines, and also illustrate the CENIS commands that invoke the Student Interest software component programs.

Table 4.2.3 Student Interest Programs of CENIS

Computational Step	CENIS Program Name	Program Function
	CDTODK	Loads DOT cards to disk file STLBFL(16).
II-a	SISVFL	Edits Questionnaire data and creates survey data file SISVFL(17).
II-b	SISRTS	Sorts the survey data file (area within Future Plans within SIS Occupation Code) onto file SISRTS(20).
II-c	SIMRGD	Edits Scout data and copies onto file SIMRGD(23) and also summarizes the the survey data onto this same file
II-d	SISRTD	Sorts file SIMRGD(23) onto file SISRTD(24) by Future Plans within Area within DOT number within Taxonomy number.
II-e	SIRPPG	Computes preliminary Student Interest Analysis on a type 1 run and final Student Interest reports on a type 2 run. (See text for the run-type definition.) This is the only report generation program in the Student Interest component.

Table 4.2.4 Command Language Statements in the Student Interest Component

Program Invoked	CENIS Command
CDTODK	EXECUTE LABEL FILE
SISVFL	EXECUTE SURVEY FILE
SISRTS	EXECUTE SORT SURVEY
SIMRGD	EXECUTE SCOUT FILE
SISRTD	EXECUTE SORT DATA
SIRPPG	EXECUTE REPORTS

4.2.3 Student Interest Component Datasets

4.2.3.1 Dataset SILBFL

Inasmuch as the Student Interest DOT table, prepared in accordance with Table 4.1.2 specifications, is used in all phase 2 computational steps, except the two involving sorting, this is the first card file read by the Student Interest System. It is stored on a disk file by executing the card-to-disk program CDTODK. This file is maintained as a card image, 80 byte record, on file SILBFL(16). See Table 4.1.2 for the record layout.

Each three-digit occupation code in the file has two associated cards which must appear as a pair. Card 1 must be first and it defines the OE/DOT Number and Title. Card 2 defines the OE Taxonomy Number and Title. Both cards must contain the SIS-DOT Code. More than one SIS code can be used or assigned to the same OE DOT/Taxonomy pair, but the reverse is not permitted. If the same SIS code should be assigned to more than one DOT/Taxonomy, then the effect would be that the last assignment in the table

would be used.

4.2.3.2 Dataset SISVFL

The regular survey data cards, punched from the Student Interest Questionnaires, are examined to see that the content is plausible and, if it is, a data record is written on file SISVFL(17) for each occupation mentioned. Two records are normally written for each questionnaire corresponding to the two career choices. However, only one record is written if a student indicates a first choice occupation, but not a second choice. The checks made on the data are that the grade code is 11 or 12, that the certainty code is 1, 2, or 3, that Future Plans be 1, 2, 3, 4 or 5, and that a first choice occupation is coded. Both the first choice occupation and the second, if given, are checked to see that the DOT table contains the SIS codes.

If any of the above checks detect an error in a data card, then no information from the error card is retained and the card is punched, as well as printed, for the sole purpose of making corrections easier. If any questionnaire cards are found to contain errors, then a signal is generated to stop further processing.

The data record on file SISVFL(17) is a 186 byte record for each occupation. Byte number 186 contains a 1 if the record corresponds to a first choice occupation and a 2 if it corresponds to a second choice occupation. The record content is given in Table 4.2.5.

Table 4.2.5 Record Layout for Survey Data File SISVFL

Byte Position	Content
1	Constant of 1
2-4	SIS Occupation Code
5-11	Taxonomy Number
12-80	Taxonomy Title
81	Constant of 2
82-84	SIS Occupation Code
85-95	DOT Number
96-160	DOT Title
161-162	County Number
163-166	District Number
167-170	School Number
171-172	Merged Area Number
173-174	Grade Number
175-177 *	First or Second Choice SIS Occupation Code
178-180 *	Second or First Choice SIS Occupation Code
181	Certainty Code
182	Future Plans
183-185 **	Batch Control Number
186 *	Record Number

* If byte 186 contains a 1, then byte positions 175-177 contain the code for the first choice career. If not, then positions 175-177 contain the code for the second choice career (The Student Interest System

design does not call for the direct use of positions 1 through 170 of the record in the course of its analysis operations. These positions are carried so that the data file can be matched with other CENIS component data should the need arise.).

4.2.3.3 Dataset SISRTS

The program named SISRTS specifies that the file SISVFL be sorted in the sequence of Occupation (position 175-177)/Future Plans (position 182)/ Merged Area(positions 171-172). The sorted file is output as SISRTS on Unit 20.

There is no change in the record format, so the description of the records in file SISVFL(17) is also applicable to the records in file SISRTS(20).

4.2.3.4 Dataset SIMRGD

The program named SIMRGD prepares the basic computer record from which all the Student Interest Reports are derived. The record written in file SIMRGD(23) contains DOT/Taxonomy numbers, so that the file can be sorted. The record content yields Head Count information, the number of students choosing each career and the probable number of students entering the career.

The Scout data card contains actual counts of students in each grade and, for each choice, those that selected a specific occupation. Hence this portion of the record was kept intact. Probability data were computed by assuming that seven out of ten students would actually enter their first choice occupation and that three out of ten would enter their second

choice occupation. No additional assumptions were made, hence the probability figures were computed as follows:

Probability of entering = .7 x (actual number choosing the career as their first choice)
+ .3 x (actual number choosing the career as their second choice).

The probability figures are referred to as "prorated sample data" in the reports.

The tabulation of data for the grade by choice breakdown of the survey data is done in a straight-forward manner. Data records with a 1 in position 186 represent one first-choice tally in the appropriate grade for the actual first choice column on the reports. However, a weight of 1.0, 0.7, 0.6, or 0.5 is used as the increment in the corresponding probability column depending on the following conditions: 1) Only one occupation specified, 2) very sure of first choice, 3) moderately sure of first choice, and 4) not sure of first choice. Data records containing a 2 in position 186 are handled in a similar manner and the weights of 0.3, 0.4, and 0.5 are used if: 1) Very sure of first choice, 2) moderately sure of first choice, and 3) not sure of first choice.

The edit procedure used on the questionnaire data cards insures that there are no input records for a second choice career without an input of a first choice record for the same career. Therefore, the tallies made in the first choice-actual are head counts of the actual number of students. It is not known at the present time whether the processing procedure for the Scout data imposed a similar restriction. Head counts for the Scout data are taken from the first choice-actual fields in the same manner as the one used on the survey data. Table 4.2.6 exhibits the content of the

data record in SIMRGD.

Table 4.2.6 Record Content for SIMRGD(23) File

Byte Position	Content
1	Card Number - coded 4 for Questionnaire data and 5 for Scout data
2-4	SIS Code Number
5-6	Merged Area Number
7	Future Plans
8-14 *	Probability Associated with the Eleventh Grade - First Choice Career
15-21 *	Probability Associated with the Twelfth Grade - First Choice Career
22-28 *	Probability Associated with the Eleventh Grade - Second Choice Career
29-35 *	Probability Associated with the Twelfth Grade - Second Choice Career
36-41	Actual Number Eleventh Grade - First Choice
42-47	Actual Number Twelfth Grade - First Choice
48-53	Actual Number Eleventh Grade - Second Choice
54-59	Actual Number Twelfth Grade - Second Choice
63-69	Taxonomy Number
70-80	DOT Number

* One decimal place following the decimal points.

4.2.3.5 Dataset SISRTD

The program named SISRTD produces a sort of the data on file SIMRGD(23) in order by OE Taxonomy number/OE DOT number/Future Plans. A new file SISRTD(24) is created without changing the format of the records.

4.2.3.6 File SIINFL, The Interface File

The program named SIRPPG is used to create this file and to perform other functions. Files SISRTD(24) and SILBFL(16), together with the control and specification cards described in Tables 4.2.1, 4.2.2 and 4.3.1, are used by this program to produce the final Student Interest Reports 1 through 8.

The Interface Data File SIINFL(31) is created in a type 2 run. The projected area totals which appear on Student Interest Report 5 make the data base for the Interface file. Table 4.2.7 exhibits the content of the records—three 80 byte card image records represent one logical record. This dataset is, of course, used by the Interface Component software.

Table 4.2.7 Student Interest Interface File SIINFL(31)

Byte Position	Content
1, Record 1	Constant 6
2-3, Record 1	SIS Occupation Code
4-10, Record 1	Taxonomy Number
11-22, Record 1	DOT Number
23, Record 1	Record Number 1
24-29, Record 1	Area 1 Projection of Prorated Totals
30-35, Record 1	Area 2 Projection of Prorated Totals
... ...	...
66-71, Record 1	Area 8 Projection of Prorated Totals
1-22, Record 2	Same as in Record 1
23	Record Number 2
24-29	Area 9 Projection of Prorated Totals
30-35	Area 10 Projection of Prorated Totals
...	...
66-71	Area 16 Projection of Prorated Totals
1-22, Record 3	Same as in Record 1
23	Record Number 3
24-55	DOT Title
56-80	Taxonomy Title

4.3 Student Interest Component Reports

There are eight printed reports generated in step II-e. Student Interest Reports 1, 2, and 3 are generated as a group on a type 1 run. These three reports are computed from the data described in Tables 4.1.1, 4.1.3, and 4.2.1 (actual counts of the number of students in the survey and in the state) and are not dependent on weights. Student Interest Reports 4 through 8 all require weights and Reports 7 and 8 also require that two percentages be known before the reports can be formed. The latter group, 4 through 8, are computed on a type 2 run and require the weights and percentages be furnished as indicated in Table 4.2.3.

Type 1 run of step II-e

The type 1 run is normally the first one undertaken since the weights printed in Report 1, and the percentages printed in Report 3, are necessary for the type 2 run. These figures are punched into a sixteen-card deck, one card for each merged area, for use on a type 2 run. Report 2 is printed strictly to facilitate the assessment of the Student Interest data prior to making further use of the data. The first sixteen rows of data in Report 2 are counts for each future plans category for the regular data and the next sixteen rows contain corresponding counts for the Scout data.

The weights computed and printed in Report 1 are the ratio of the number of students in the merged area subject to the sample plan to the number of students in the sample. Row one contains the weights for the regular plan and row two contains the weights, also by area, for the Scout system.

The column headings in Report 3 completely describe the content of the reports. The only further explanation needed is to explain why some of the areas have only one pair of lines labeled

1. Sample Number
2. Population Number

and others have three such pairs. In the case of one pair, only the regular survey was used in the area. If more than one pair, then the Scout survey was also used in the area and is printed in the second pair of lines. The third pair is the total for the area.

Type 2 run of step II-e

A type 2 run is distinguished from a type 1 run in that reports are specified, as shown in Table 4.2.2, for one or more merged areas. A type 2 run requires that weights and percentages be entered according to the directions in Table 4.2.3. On any type 2 run, Report 1 and 4 through 8 are computed together with the file for the Interface of CENIS.

Report 1 and the sixteen-card deck are prepared on a type 2 run strictly for the assessment of the Student Interest System and data content.

The eight Student Interest Reports are exhibited in Figures 4.3.1 through 4.3.8.

The following is a written summary of what the reports contain.

Report 1: Weights for each survey method by merged area. This report is computed from count data.

Report 2: Head counts for survey type by merged area by Future Plans.

Report 3: Head counts for survey method by merged area—this report also shows the percentage of students in the merged area and in the state whose future plans include full-time employment and also a four-year college.

Report 4: Projection of future plans for each merged area—computed from head counts and weights.

Report 5: Prorated sample data and projections distributed by area and occupation. This report also shows the distribution of head count data of the first and second choice for students with future plans of less than four years of college and for full-time employment.

Report 6: Prorated sample data and projections are distributed by occupation, DOT within Taxonomy, for each merged area and the state total.

Report 7: Students who plan full-time employment are used in this report. Sample and projected data is presented by occupation for a grade by choice by area report.

Report 8: Same as Report 7, except that students whose future plans are less than four-year college are used.

THE WEIGHTS FOR PROJECTING THE REGULAR RIS SURVEY AND THE SCOLT SURVEY FOR EACH MAPPED AREA
HAVE BEEN COMPUTED FROM THE DATA USED IN THIS REPORT RUN AND ARE PRINTED FOR CHECKING OR FOR USE IN FUTURE RUNS:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6.6386	6.5583	9.3323	4.7551	6.8069	6.2139	7.4399	1.0000	7.8825	8.4602	8.6244	7.5629	7.6189	7.8847	7.8550	7.1807
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.4204	1.0000	1.0000	1.0000	1.0000	1.0000

Figure 4.3.1 Student Interest - REPORT ONE

Figure 4.3.2 Student Interest - REPORT TWO

A CARD PUNCHED WITH AREA NUMBERS (OF INTEREST) SHOULD FOLLOW THE 4 TOTALS CARDS TO GET REPORTS BY MERGED AREA.

THE NUMBER OF SUMMARY RECORDS IS10582

FUTURE PLANS BY 'AREA':

388	94	334	361	146	9
162	39	291	230	76	6
66	27	121	111	43	4
74	15	151	149	53	2
197	51	333	314	57	2
120	22	197	174	58	3
293	73	213	299	139	6
0	0	0	0	0	0
363	77	276	373	107	4
297	[illegible]	293	506	106	10
341	[illegible]	339	407	145	11
224	62	219	28[illegible]	93	6
269	54	216	[illegible]	94	5
67	15	115	102	20	2
131	41	152	179	113	3
149	29	131	161	75	3
0	0	0	0	0	0
0		0	0	0	0
[illegible]	[illegible]	0	0	0	0
[illegible]	[illegible]	0	[illegible]	[illegible]	0
[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]
		0	[illegible]	[illegible]	[illegible]
		0		[illegible]	[illegible]
[illegible]	[illegible]	0	0	0	0
0	[illegible]	0	0	0	0

Figure 4.3.2 Student Interest - REPORT TWO

Figure 4.3.3 Student Interest - REPORT THREE

SURVEYED NUMBERS	MERGED AREA 11 NUMBER	MERGED AREA 11 PERCENT	STATEWIDE NUMBER
1. SAMPLE NUMBER	1326	10.5	12592
2. POPULATION NUMBER	11436	12.0	94995
1. SAMPLE NUMBER	5273	100.0	5273
2. POPULATION NUMBER	7490	100.0	7490
1. SAMPLE NUMBER	6599	36.9	17865
2. POPULATION NUMBER	18926	18.5	102485

PER CENT (EXCLUDING MILITARY SERVICE)

	FULL TIME EMP.	4-YEAR COLLEGE
MERGED AREA	5.2	5.2
STATEWIDE	18.6	19.7

Figure 4.3.4 Student Interest - REPORT FOUR

SURVEYED NUMBERS	MEDWEL AREA 11 NUMBER	MEDWEL AREA 11 PERCENT	STATEWIDE NUMBER
1. SAMPLE NUMBER	583	90.4	645
2. POPULATION NUMBER	11436	12.0	94995
1. SAMPLE NUMBER	3551	100.0	3551
2. POPULATION NUMBER	7490	100.0	7490
1. SAMPLE NUMBER	4134	98.5	4196
2. POPULATION NUMBER	16926	18.5	102485
FUTURE PLANS PROJECTED			
1. FULL-TIME EMPLOYMENT	1285	3.6	
2. MILITARY SERVICE	233	0.7	
3. LESS THAN 4 YEARS OF COLLEGE	1067	3.0	
4. 4 YEAR COLLEGE OR UNIVERSITY	1889	5.3	
5. NONE OF THESE	440	1.2	
6. NOT SPECIFIED	5135	86.2	

Figure 4.3.5 Student Interest - REPORT FIVE

STATE AND MERGED AREA PROJECTIONS

MERGED AREA	AREA TOTALS SAMPLE	AREA TOTALS PROJECTED	UNDER 4 YRS COLLEGE 1ST CHOICE SAMP	UNDER 4 YRS COLLEGE 1ST CHOICE PROJ	UNDER 4 YRS COLLEGE 2ND CHOICE SAMP	UNDER 4 YRS COLLEGE 2ND CHOICE PROJ	FULL TIME EMPLOYMENT 1ST CHOICE SAMP	FULL TIME EMPLOYMENT 1ST CHOICE PROJ	FULL TIME EMPLOYMENT 2ND CHOICE SAMP	FULL TIME EMPLOYMENT 2ND CHOICE PROJ
DOT TAXONOMY 01.0604 — 451.181-010 WILDLIFE GAMEKEEPER — WILDLIFE										
1	13	89	2	13	5	33	2	13	7	47
2	7	45	3	20	1	7	2	13	3	20
3	3	25	0	0	2	18	2	18	2	18
4	5	36	2	14	0	0	0	0	1	7
5	10	69	1	7	6	41	2	14	2	14
6	7	44	3	19	5	31	2	12	1	6
7	9	68	1	7	6	45	6	45	1	7
9	9	69	1	8	4	32	5	39	5	39
10	16	138	6	51	3	25	4	34	3	25
11	196	386	2	17	3	26	3	26	5	43
12	9	70	5	38	5	38	0	0	3	23
13	10	75	5	38	3	23	5	38	2	15
14	4	32	2	16	2	16	0	0	1	8
15	13	99	2	16	5	39	3	24	4	31
16	10	73	3	22	2	14	3	22	4	29
TOTAL	321	1318	38	286	52	388	39	298	44	332
DOT TAXONOMY 04.0100 — 050.088-034 MARKET RESEARCH ANALYST — ADVERTISING SERVICES										
1	0	2	0	0	1	7	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	3	0	0	0	0	0	0	0	0
11	2	17	0	0	1	9	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	1	7	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0
TOTAL	3	29	0	0	2	16	0	0	0	0
DOT TAXONOMY 04.0100 — 164.068-010 ADVERTISING ASST. — ADVERTISING SERVICES										
1	2	13	1	7	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	1	3	0	0	0	0	0	0	0	0
5	1	7	0	0	1	7	1	7	0	0
6	0	0	0	0	0	0	0	0	0	0
7	1	4	0	0	2	15	0	0	0	0
9	1	5	0	0	0	0	2	16	0	0
10	1	11	1	8	0	0	0	0	1	8
11	11	27	0	0	1	9	0	0	1	9
12	1	8	0	0	0	0	1	8	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	1	5	0	0	0	0	0	0	2	16
16	2	16	1	7	0	0	1	7	0	0
TOTAL	22	103	3	22	4	31	5	38	4	33

Figure 4.3.6 Student Interest - REPORT SIX

MERGED AREA 6

DOT# & TITLE		TAXONOMY# & TITLE		AREA TOTALS SAMPLE	AREA TOTALS PROJECTED	STATE TOTALS SAMPLE	STATE TOTALS PROJECTED
400.000-000	GENERAL AGRI	01.0100	AGRICULTURAL	3	20	66	401
421.883-010	FARM HAND, G	01.0100	AGR. PRODUCT	22	139	442	2983
040.081-018	ANIMAL HUSBA	01.0101	ANIMAL SCIEN	2	10	50	227
429.228-010	POULTRYMAN,	01.0101	ANIMAL SCIEN	0	0	2	9
096.128-014	EXTENSION AG	01.0104	FARM BUSINES	0	1	3	7
409.168-010	MANAGER, FAR	01.0104	FARM BUSINES	6	39	83	605
389.884-101	EXTERMINATOR	01.0201	AGR. CHEMICA	0	0	7	39
262.358-014	SALESMAN, GR	01.0202	FEEDS	0	0	7	48
529.132-014	CUSTOM FEED	01.0202	FEEDS	2	11	17	123
040.381-014	SEED ANALYST	01.0203	SEEDS	0	0	1	9
356.874-016	VETERINARY A	01.0299	AGR. SUPPLIE	4	27	62	407
624.281-010	FARM EQUIP.	01.0301	AGR. POWER &	2	14	38	289
624.381-014	FARM MCH. SE	01.0301	AGR. POWER &	0	2	3	34
040.081-046	HORTICULTURA	01.0500	ORNAMENTAL H	1	4	24	167
407.181-010	LANDSCAPE GA	01.0504	LANDSCAPING	1	4	33	107
407.884-010	GROUNDSKEEPE	01.0504	LANDSCAPING	0	0	9	27
406.168-010	NURSERYMAN	01.0505	NURSERY OPR.	0	0	4	28
407.134-010	PARK FOREMAN	01.0506	TURF MANAGEM	2	10	111	576
379.168-018	CONSERVATION	01.0600	AGRICULTURAL	8	52	182	1001
040.061-038	FORESTER	01.0601	FORESTS	3	20	159	749
040.061-074	SOIL CONSERV	01.0603	SOIL	0	0	4	18
451.181-010	WILDLIFE GAM	01.0604	WILDLIFE	7	44	321	1318
050.088-034	MARKET RESEA	04.0100	ADVERTISING	0	0	3	29
164.068-010	ADVERTISING	04.0100	ADVERTISING	0	0	22	103
164.168-010	ACCOUNT EXEC	04.0100	ADVERTISING	0	0	52	344
165.068-022	PUBLIC REL.	04.0100	ADVERTISING	1	7	45	171
185.158-010	FASHION COOR	04.0200	APPAREL AND	1	9	44	313
263.358-000	CLOTHES/ACCE	04.0200	APPAREL AND	5	33	95	649

Figure 4.3.7 Student Interest - REPORT SEVEN

MERGED AREA 6 FUTURE PLAN = 1 (FULL-TIME EMPLOYMENT)
AREA PERCENT OF TOTAL = 22.1 STATEWIDE PERCENT OF TOTAL = 18.6

	JUNIORS				SENIORS				TOTALS			
	1ST CHOICE		2ND CHOICE		1ST CHOICE		2ND CHOICE		1ST CHOICE		2ND CHOICE	
	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED
400.000-000 GENERAL AGRICULTURE												
AREA TOTAL	0	0	0	0	1	6	1	6	1	6	1	6
STATE "	12	90	10	72	8	60	9	64	20	151	19	137
421.883-010 FARM HAND, GENERAL												
AREA TOTAL	7	44	1	6	3	19	0	0	10	62	1	6
STATE "	130	956	26	198	85	644	25	183	215	1600	51	381
040.081-018 ANIMAL HUSBANDRYMAN												
AREA TOTAL	0	0	1	6	0	0	0	0	0	0	1	6
STATE "	3	23	3	22	2	15	5	36	5	39	8	58
429.228-010 POULTRYMAN, TECH. ADVI.												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	1	8	0	0	0	0	1	8	1	8	1	8
096.128-014 EXTENSION AGENT												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	0	0	0	0	0	0	0	0	0	0
409.168-010 MANAGER, FARM												
AREA TOTAL	2	12	1	6	2	12	1	6	4	25	2	12
STATE "	20	153	18	131	14	102	23	180	34	255	41	311
389.884-101 EXTERMINATOR												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	0	0	0	0	0	0	0	0	0	0
262.358-014 SALESMAN, GRAIN & FEED												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	1	8	0	0	1	8	0	0	2	15
529.132-014 CUSTOM FEED MILL OPR.												
AREA TOTAL	1	6	0	0	1	6	0	0	2	12	0	0
STATE "	2	15	4	34	5	35	4	31	7	50	8	65
040.381-014 SEED ANALYST												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	0	0	0	0	0	0	0	0	0	0
356.874-016 VETERINARY ASST.												
AREA TOTAL	1	6	0	0	0	0	0	0	1	6	0	0
STATE "	5	38	4	31	7	51	6	47	12	89	10	77
624.281-010 FARM EQUIP. MECH.												
AREA TOTAL	1	6	0	0	0	0	2	12	1	6	2	12
STATE "	7	51	20	148	6	44	11	86	13	95	31	234
624.381-014 FARM MCH. SET-UP MAN												
AREA TOTAL	0	0	1	6	0	0	0	0	0	0	1	6
STATE "	0	0	7	50	0	0	4	30	0	0	11	80

Figure 4.3.8 Student Interest - REPORT EIGHT

MERGED AREA 11 FUTURE PLAN = 3 (LESS THAN 4 YEARS OF COLLEGE)
AREA PERCENT OF TOTAL = 5.2 STATEWIDE PERCENT OF TOTAL = 19.7

	JUNIORS				SENIORS				TOTALS			
	1ST CHOICE		2ND CHOICE		1ST CHOICE		2ND CHOICE		1ST CHOICE		2ND CHOICE	
	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED	SAMPLE	PROJECTED
241.168-010 CLAIMS ADJUSTER												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	1	7	0	0	0	0	1	8	1	7	1	8
250.258-014 SALESMN., INS.												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	1	8	2	16	3	24	1	7	4	31	3	23
915.867-010 SERV. STA. ATTENDANT												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	3	25	0	0	2	14	2	15	5	38	2	15
250.358-026 SALESMAN, REAL ESTATE												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	3	20	2	16	1	7	2	13	4	27	4	29
195.168-026 DIRECTOR, RECREATION												
AREA TOTAL	1	9	1	9	0	0	2	17	1	9	3	26
STATE "	7	54	4	31	1	8	9	69	8	63	13	100
286.358-010 SALESPERSON, SPORTING GOODS												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	10	77	6	44	3	20	6	40	13	97	12	85
019.188-010 TRAFFIC ENGINEER												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	1	8	0	0	0	0	0	0	1	8
352.878-010 AIRLINE STEWARDESS												
AREA TOTAL	4	34	2	17	3	26	2	17	7	60	4	34
STATE "	63	473	38	290	34	258	35	260	97	731	73	550
905.883-014 TRACTOR-TRAILER TRUCK DRIVER												
AREA TOTAL	1	9	1	9	0	0	1	9	1	9	2	17
STATE "	7	51	18	133	0	0	10	81	7	51	28	214
906.883-026 LIGHT-TRUCK DRIVER												
AREA TOTAL	0	0	1	9	0	0	0	0	0	0	1	9
STATE "	0	0	7	52	0	0	3	19	0	0	10	71
912.368-022 AIRLINE RESERVATIONIST												
AREA TOTAL	2	17	3	26	2	17	2	17	4	34	5	43
STATE "	19	140	31	227	10	77	11	83	29	217	42	310
919.168-010 DISPATCHER, MOTOR VEHICLE												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	1	7	0	0	0	0	0	0	1	7
922.883-010 INDUSTRIAL TRUCK OPERATOR												
AREA TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
STATE "	0	0	0	0	0	0	0	0	0	0	0	0

4.4 Use of Computer Software in Report Generation

Assuming that the same data are collected using the survey as well as the Scout system, all six programs must be executed in the sequence described in Table 4.2.3. It is possible to skip steps on any run, but the data files created by the bypassed step must be available from a previous run.

The decision to run a step again in its entirety, or to attempt to salvage partially completed runs or files, is one that is frequently encountered in systems such as the Student Interest component of CENIS. The design of this system is such that all programs, except SISVFL, should be run again from the beginning. In the case of SISVFL, the user must decide whether to edit all the questionnaire data again or to make the technical changes in the DISP=(NEW,KEEP) field. Usually, it is best to re-run only those steps affected by a change in data input.

Assuming that the first application of the Student Interest System is to load the SIS DOT table, and edit questionnaire data, then the CENIS language is as follows:

```
STUDENT INTEREST
        EXECUTE LABEL FILE
        EXECUTE SURVEY FILE
```

If the second application involves the Scout data and the reports on a type 1 run, then the CENIS language is:

```
STUDENT INTEREST
        EXECUTE SORT SURVEY
        EXECUTE SCOUT FILE
        EXECUTE SORT DATA
        EXECUTE REPORTS
```

Now, if the third application is to run the type 2 reports, then the appropriate change is made in the Report Selection card described in Table 4.2.2 and the CENIS language is:

STUDENT INTEREST

EXECUTE REPORTS

A summary of the data files on the Student Interest component, assuming all data are currently on cards and are being entered for the first time, are shown below.

```
//FT18F001  DD *  TABLE 4.1.1  CARDS
    (Survey questionnaire data cards)
//FT22F001  DD *  TABLE 4.1.3  CARDS
    (Scout data cards)
//FT25F001  DD *  TABLES 4.2.1, 4.2.2, and 4.2.3  CARDS
    (Population totals - 4 cards)
    (Report selection card)
    (16 weight cards in type 2 runs)
//CD58F001  DD *  TABLE 4.1.2  CARDS
    (SIS DOT table cards).
```

These DD statements appear, in the above given order, in the catalogued procedures CENIS1 and CENIS2. Therefore the DD statements must appear in the given order to properly specify a temporary override to the procedure. Naturally, once any one of the card decks are entered, they need not be reentered on subsequent runs if the associated dataset is saved.

CHAPTER 5

CENIS STUDENT FOLLOWUP COMPONENT

5.1 Student Followup - Data Collection and Entry

The followup of students who left technical training programs, in secondary schools and area community colleges, three years prior to the time of the CENIS implementation, was conducted as a mail census using school address records. A copy of the survey instrument is shown in Figure 5.1.1.

This set of data, because it is rather small, is one of the easier sets to handle. Editing for errors in reporting was done by hand, and only a small amount of computer editing of punch card data was needed. The format used for punch cards is shown in Table 5.1.1. The card data were transferred to tape (disk) in fixed length records of 80 characters (bytes), and the resultant dataset is named SFDFL. A second card dataset, containing annotative characters for use on output reports, is also input and stored on disk (tape) as a dataset named SFLFL. The card deck is, of course, in a standard form and is supplied with the computer program.

Once the data are entered into the computer, component reports are generated using existing programs, and a data file for use in CENIS Interface is prepared. These operations, and the characteristics of the software, will be described in succeeding sections.

(1-10) County District School

(11-20) Taxonomy

(21-28) Level Type S.E. Obj.

(30-35) Code

Name of Your Vocational Program for 1968-69

Have you sought employment in the occupational area for which you were trained?

(36) ☐ Yes

If Yes, how many job offers did you receive? (CHECK ONE BOX)

1. ☐ None
2. ☐ One
3. ☐ Two or Three
4. ☐ Four or More

(37) ☐ No

If No, please indicate reason. (CHECK ONE BOX)

1. ☐ Sought employment in another occupational area
2. ☐ Entered another school
3. ☐ Housewife
4. ☐ Physical or other handicap
5. ☐ Not interested in a job
6. ☐ Entered the military service
7. ☐ Only wanted to work part-time
8. ☐ Other (Specify)

Have you served in the military service since leaving this program?

(38) ☐ Yes ☐ No

Since you left this vocational program, have you enrolled in any additional education program(s)?

(39) ☐ Yes ☐ No

If yes, check purpose(s):

(40-43) ☐ Program(s) for personal growth and satisfaction
☐ Program(s) to assist you on your job
☐ Program(s) to prepare you for another occupation
☐ College degree program

What is your current employment status? (CHECK ONE BOX)

(44)
1. ☐ Employed full-time
2. ☐ Employed part-time
3. ☐ Unemployed, but looking for work
4. ☐ Unemployed and not looking for work
5. ☐ In the military service
6. ☐ Full-time student

What is your present or most recent job? (Exclude military service)

(45) ___ _____
Job Title

_____
Firm Name

(46) ___ _____
City or Town, State

Briefly describe your duties on this job.

_____

How many full-time jobs have you held since you left this vocational program? (Exclude military service) (CHECK ONE BOX)

(47)
1. ☐ None
2. ☐ 1
3. ☐ 2
4. ☐ 3
5. ☐ 4 or More

If you have held more than one full-time job what was your first full-time job after leaving this training program? (Exlude military service)

(48) ___ _____
Job Title

_____
Firm Name

(49) ___ _____
City or Town, State

What have been your weekly wages since leaving this vocational program? (CHECK ONE BOX PER COLUMN) (Exclude military service)

(50) Present or most recent wages.	(51) First full-time wages.
1. ☐ $50-$75 weekly	1. ☐ $50-$75 weekly
2. ☐ $76-$100 weekly	2. ☐ $76-$100 weekly
3. ☐ $101-$125 weekly	3. ☐ $101-$125 weekly
4. ☐ $126-$150 weekly	4. ☐ $126-$150 weekly
5. ☐ $151-$200 weekly	5. ☐ $151-$200 weekly
6. ☐ $201 or more	6. ☐ $201 or more

How satisfactory was this vocational training? (CHECK ONE BOX)

(52)
1. ☐ Very Satisfactory
2. ☐ Satisfactory
3. ☐ Unsatisfactory
4. ☐ Very Unsatisfactory

How important was this educational experience in obtaining your first full-time job? (CHECK ONE BOX)

(53)
1. ☐ The training was a requirement for the job.
2. ☐ The training was a factor in my selection for the job.
3. ☐ The training was of no value in my selection for the job.

Of what value was this educational experience in your performance on the job? (Exclude military service) (CHECK ONE BOX PER COLUMN)

(54) Present or most recent job	(55) First full-time job
1. ☐ Very Adequate	1. ☐ Very Adequate
2. ☐ Adequate	2. ☐ Adequate
3. ☐ Of Little Value	3. ☐ Of Little Value
4. ☐ Of No Value	4. ☐ Of No Value

Please list any suggestions which if implemented could improve the quality of the program, especially if you checked no. 3 or no. 4 in (52) above.

_____

SP—17472

CE-12
Sept. 1972

Figure 5.1.1 Student Followup Survey Instrument

Table 5.1.1 THREE-YEAR STUDENT FOLLOWUP CARD FORMAT

Item Number	Card Columns	Description
1	1-2	County number: 01-99
2	3-6	District number
3	7-9	School number
4	11-20	Taxonomy number
5	21-22	Level
6	23-24	Type
7	25-26	S. E.
8	27-28	Obj.
9	30-33	Code
10	34-35	Completion code:
		1 = less than 50% completed
		2 = between 50% and 100% completed
		3 = 100% completed
11	36	Number of job offers:
		1 = none
		2 = one
		3 = two or three
		4 = four or more
12	37	Reason not seeking employment:
		1 = sought employment in other area
		2 = entered another school
		3 = housewife
		4 = handicapped
		5 = not interested

Item Number	Card Columns	Description
13	38	Served in military service:
		1 = yes
		2 = no
14	39	Enrolled in additional education programs
		1 = yes
		2 = no
		Purpose of additional education programs:
15	40	Personal growth: 1 = yes
16	41	Assist on your job: 1 = yes
17	42	Prepare for another job: 1 = yes
18	43	College degree program: 1 = yes
19	44	Current employment status:
		1 = employed full time
		2 = employed part time
		3 = unemployed, looking for job
		4 = unemployed, not looking
		5 = in military service
		6 = full time student
20	45	Present job:
		1 = actual area
		2 = related area
		3 = non-related area

Item Number	Card Columns	Description
21	46	Present location:
		1 = in district
		2 = out of district
		3 = out of state
22	47	Full time jobs since program:
		1 = none
		2 = one
		3 = two
		4 = three
		5 = four or more
23	48	First full time job:
		1 = actual area
		2 = related area
		3 = non-related area
24	49	Location of first full time job:
		1 = in district
		2 = out of district
		3 = out of state
25	50	Present weekly wages:
		1 = $50 - $75
		2 = $76 - $100
		3 = $101 - $125
		4 = $126 - $150
		5 = $151 - $200
		6 = $200 or more

Item Number	Card Columns	Description
26	51	First weekly wages:
		(Same codes as Item 25)
27	52	Vocational training:
		1 = very satisfactory
		2 = satisfactory
		3 = unsatisfactory
		4 = very unsatisfactory
28	53	Educational experience
		1 = required for job
		2 = factor in selection for job
		3 = no value in job selection
29	54	Education for present job
		1 = very adequate
		2 = adequate
		3 = of little value
		4 = of no value
30	55	Education for first job
		1 = very adequate
		2 = adequate
		3 = of little value
		4 = of no value
31	56-57	Merged area code: 01-16

5.2 Student Followup - Analysis and Report Generation Software

5.2.1 Component Programs

As in all other components, programs in this component are identified by operand name—for the benefit of the user, program name—for the benefit of the programmer, and program number—as an identifier for the supervisor software. Table 5.2.1 gives these identifiers.

The way in which these programs operate as a part of the system is illustrated in Figures 5.2.1-5.2.5. Note that the program SFDFL takes the basic set of card data, sorts it into a desired order, and creates the dataset SFDFL. This is illustrated in Figure 5.2.1. The sort order is District Number/Taxonomy Number/Present employment/Completion. Program CDTODK simply serves as a card to tape utility as shown in Figure 5.2.2. The two different types of reports in this component are produced by programs SF1RP and SF2RP, as shown in Figures 5.2.3 and 5.2.4. Finally, the creation of a dataset for use in the Interface Component analysis is accomplished by the program named SFINFL, as shown in Figure 5.2.5.

Table 5.2.1 Three Year Followup Analysis Programs

Operand Name	Program Name	Program Number
DATA FILE	SFDFL	01
LABEL FILE	CDTODK	02
REPORT ONE	SF1RP	03
REPORT TWO	SF2RP	04
INTERFACE FILE	SFINFL	05

Figure 5.2.1 Program SFDFL

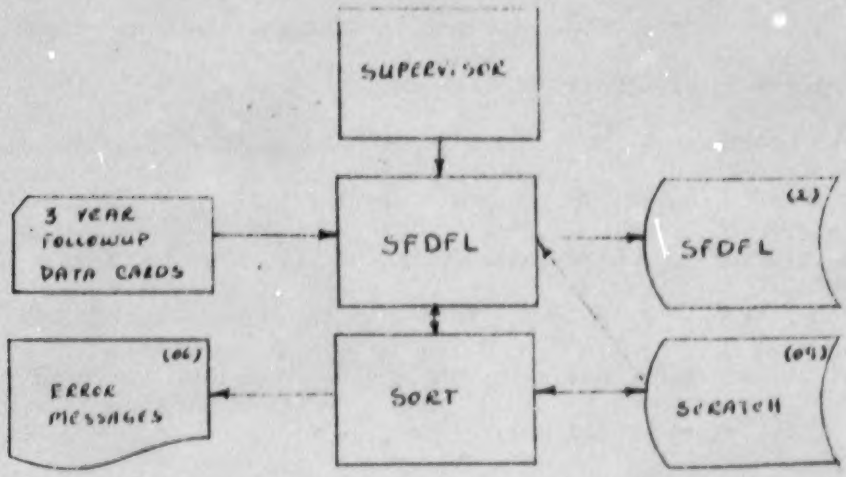


Figure 5.2.2 Program CDTODK

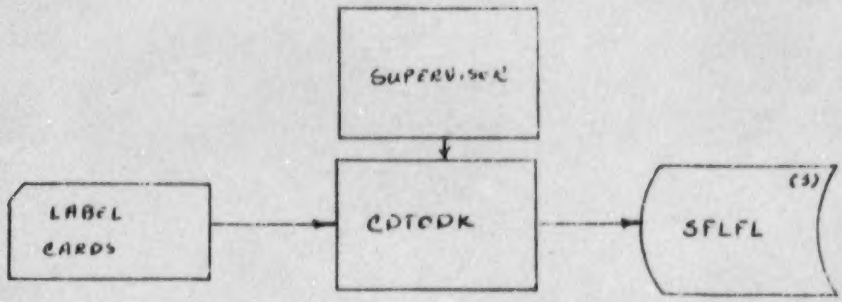


Figure 5.2.3 Student Followup - Report ONE Generation

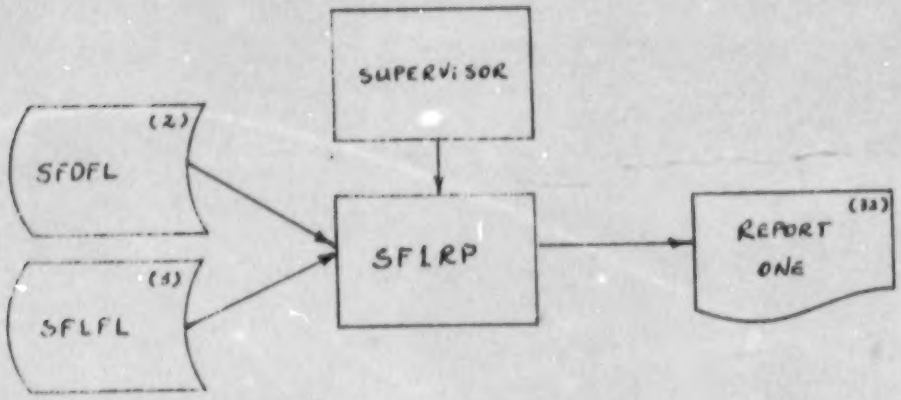


Figure 5.2.4 Student Followup - Report TWO Generation

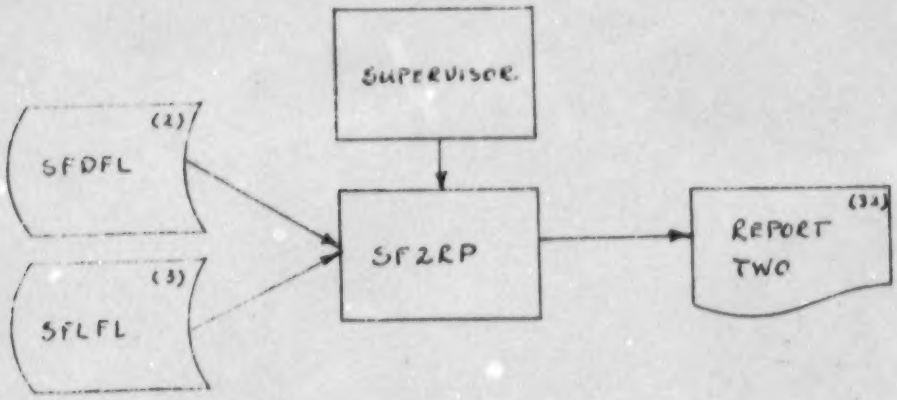
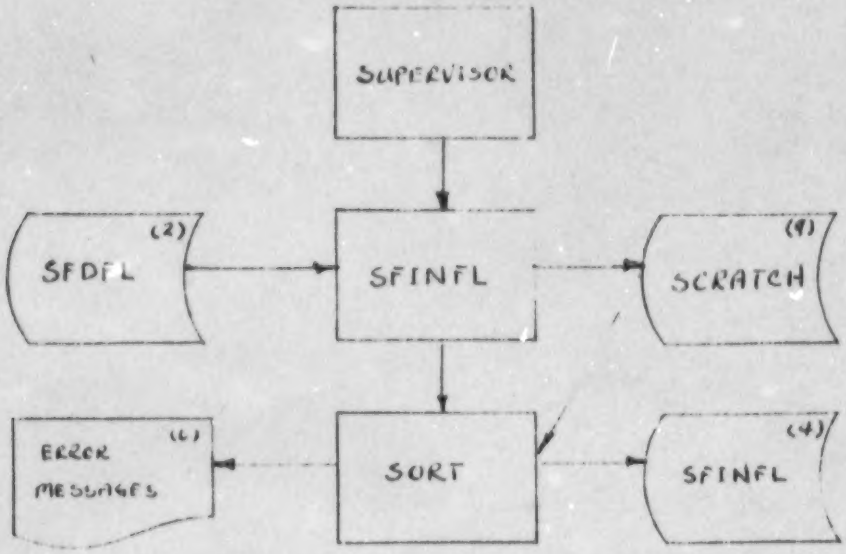


Figure 5.2.5 Creation of Student Followup Interface File



5.2.2 Student Followup - Data Files

The only data file, other than SFLFL and SFDFL which were described in section 5.1, which needs to be described is the Interface file named SFINFL. This file contains the result of certain key computations which will now be defined and described.

Total Number of Terminations - This is the total number of valid responses that were received from the mail census.

Number Available for Work - This number is the total number of terminations minus those people that were either full time military of full time students in an educational program.

Number Completing - The total number of respondents who completed their training program.

Percent Completing - That percent of total terminations that completed training.

Completers Employed in Occupational Trained or Related Area - The number of completers who are not in the military or full-time students and who are employed in that area (or a related area) for which they were trained.

Percent Completers Employed in Occupational Trained or Related Area - Percentage of the number completing who are employed in occupational trained or related area.

Number Available for Work in Occupational Trained or Related Area - The total number of persons, excluding full-time military and students, who are employed full or part time in their occupationally trained or a relative area.

Percent Available for Work in Occupational Trained or Related Area (Followup Percentage) - Percentage of all persons available for work (excludes students and military personnel) who are available for work in occupational trained or related areas.

Number Employed in Nonrelated Areas - Total number of persons, who are not in the military or full time students, who are employed full or part time in an area not related to their technical training.

Percentage Employed in Nonrelated Areas - Percentage of those available for work who are employed in nonrelated area.

Number in Full-Time Education - Tally of those persons so reporting.

Percent in Full-Time Education - Percentage based on total number of terminations.

The record format for the dataset named SFINFL is given in Table 5.2.2. The records are created in fixed blocks and written in internal notation using the FORTRAN 'A' format code.

Table 5.2.2 Student Followup File Characteristics

DD Name	DSNAME	RECFM	LRECL	BLKSIZE
FT02F001	SFDFL	FB	80	3200
FT03F001	SFLFL	FB	80	3200
FT04F001	SFINFL	FB	80	3200

5.3 Student Followup - Component Reports

Two types of reports are produced by this component software. Samples of these reports are given as Figures 5.3.1 and 5.3.2. The reports are rather self explanatory, however, succeeding paragraphs will undertake a description of these reports. The main body of these two reports is the same. The difference between the two arises from a difference in the levels of breakdown in reporting. Report ONE produces a one page report for every combination of the variables School District Number, Taxonomy Number, and Present Job Code. State totals are printed at the end of the report. Report TWO is a three page report. One page of Area School totals, one page of Secondary School totals, and the third page contains statewide totals for all area and secondary schools.

In general the report programs are simply tally programs. Responses to all the questions included in the report are tallied for all of the survey records at each level of the breakdown. Most of the relevant items, over which totals are generated, are defined in subsection 5.2.2.

The column headings on the reports indicate an additional breakdown of the number of persons responding to each question. The columns headed "< 50", "> 50", "100" refer to the three possible Completion Codes. The adjacent R% column is the row percentage, i.e. the ratio of the number of people with a given completion code answering with a given response to the total number of people answering with the same response. The adjacent column headed T% is the total percent column, i.e. the ratio of the number of people with a given completion code answering with a given response to the total number of people answering the question with any response.

COMPLETION CODE	0	R%	T%	>50	R%	T%	100	R%	T%	TOT	T%
JOB LEVELS											
NONE	10	9	1	13	12	2	85	79	12	108	15
ONE	11	4	2	11	4	2	251	92	36	273	39
TWO OR THREE	7	3	1	2	1	0	246	96	35	255	36
FOUR OR MORE	1	2	0	1	2	0	62	97	9	64	9
	29	4		27	4		644	92		700	100
DID NOT SEEK EMP											
EMPLOYMENT OTHER	28	22	11	14	11	5	84	67	32	126	48
ENTER SCHOOL	10	21	4	2	4	1	36	75	14	48	18
HOUSEWIFE	2	17	1	1	8	0	9	75	3	12	5
HANDICAP	0	0	0	0	0	0	0	0	0	0	0
NOT INTERESTED	0	0	0	1	25	0	3	75	1	4	2
MILITARY	6	16	2	1	3	0	31	82	12	38	15
PART-TIME	0	0	0	0	0	0	3	100	1	3	1
OTHER	6	19	2	3	10	1	22	71	8	31	12
	52	20		22	8		188	72		262	100
MILITARY											
YES	14	7	1	11	6	1	168	87	18	193	20
NO	64	8	7	33	4	3	664	87	70	761	80
	78	8		44	5		832	87		954	100
ADDITIONAL EDUC											
YES	36	10	4	16	4	2	324	86	34	376	39
NO	43	7	4	34	6	4	507	87	53	584	61
	79	8		50	5		831	87		960	100
PURPOSE OF EDUC											
PERSNL GRWTH (N)	29	10	8	11	4	3	241	86	64	281	75
(YES)	5	6	1	3	3	1	79	91	21	87	23
ASST ON JOB (N)	24	10	6	9	4	2	201	86	53	234	62
(YES)	10	7	3	5	4	1	119	89	32	134	36
PREP OTHR JOB(N)	18	6	5	12	4	3	253	89	67	283	75
(YES)	16	19	4	2	2	1	67	79	18	85	23
COLLEGE DEGR (N)	22	9	6	9	4	2	214	87	57	245	65
(YES)	12	10	3	5	4	1	106	86	28	123	33
EMPLOYMENT STATUS											
FULL-TIME	62	9	6	35	5	4	626	87	63	723	73
PART-TIME	7	9	1	1	1	0	71	90	7	79	8
UNEMP. LOOKING	7	19	1	4	11	0	26	70	3	37	4
UNEMP. NOT LOOKG	0	0	0	8	8	1	87	92	9	95	10
MILITARY	0	0	0	1	5	0	18	95	2	19	2
FULL-TIME STUDNT	4	11	0	1	3	0	31	86	3	36	4
	80	8		50	5		859	87		989	100
PRESENT JOB											
IN ACTUAL FIELD	14	3	1	13	3	1	471	95	47	498	50
IN RELATED FIELD	17	9	2	5	3	1	171	89	17	193	19
NON-RELATED FLD	49	16	5	32	10	3	224	73	22	305	31
	80	8		50	5		866	87		996	100
PRESENT LOCATION											
IN DISTRICT	56	8	6	37	5	4	629	87	63	722	72
OUT DISTRICT	15	10	2	6	4	1	123	85	12	144	14
OUT STATE	9	7	1	7	5	1	114	88	11	130	13
	80	8		50	5		866	87		996	100
% FULL-TIME JOBS											
NONE	12	15	1	4	5	0	63	80	6	79	8
ONE	30	7	3	18	4	2	380	89	39	428	43

COMPLETION CODE	1	R%	T%	2	R%	T%	3	R%	T%	TOT	T%
TWO	20	7	2	13	4	1	262	89	27	295	30
THREE	10	9	1	8	8	1	88	83	9	106	11
FOUR OR MORE	8	10	1	6	8	1	65	82	7	79	8
	80	8		49	5		858	87		987	100
EIBSI JOB											
IN ACTUAL FIELD	14	5	3	8	3	2	279	93	55	301	59
IN RELATED FIELD	3	4	1	3	4	1	67	92	13	73	14
NON-RELATED FLD	22	17	4	17	13	3	94	71	19	133	26
	39	8		28	6		440	87		507	100
EIBSI LOCATION											
IN DISTRICT	25	7	5	21	6	4	318	87	63	364	72
OUT DISTRICT	11	12	2	5	6	1	73	82	14	89	18
OUT STATE	3	6	1	2	4	0	49	91	10	54	11
	39	8		28	6		440	87		507	100
PRESENT WAGES											
50- 75	15	11	2	5	4	1	111	85	13	131	16
76-100	8	5	1	7	4	1	146	91	17	161	19
101-125	14	7	2	9	5	1	170	88	20	193	23
126-150	11	7	1	6	4	1	136	89	16	153	18
151-200	13	10	2	5	4	1	111	86	13	129	15
201-	8	11	1	8	11	1	55	77	7	71	8
	69	8		40	5		729	87		838	100
EIBSI WAGES											
50- 75	16	9	2	10	6	2	154	86	23	180	27
76-100	9	4	1	9	4	1	194	92	29	212	32
101-125	13	10	2	5	4	1	109	86	16	127	19
126-150	10	12	2	3	4	0	68	84	10	81	12
151-200	4	9	1	2	5	0	39	86	6	44	7
201-	2	12	0	2	12	0	13	76	2	17	3
	54	8		31	5		576	87		661	100
IBNG SATISFACT											
VERY SATISFACTOR	22	5	2	16	4	2	398	91	40	436	44
SATISFACTORY	38	8	4	27	6	3	409	86	42	474	48
UNSATISFACTORY	14	30	1	5	11	1	28	60	3	47	5
VERY UNSATISFACT	2	8	0	2	8	0	22	85	2	26	3
	76	8		50	5		857	87		983	100
IBNG IMPORTANCE											
REQUIREMENT	10	3	1	8	3	1	285	94	30	303	32
FACTOR	18	5	2	14	4	1	359	92	38	391	41
NO VALUE	46	18	5	26	10	3	182	72	19	254	27
	74	8		48	5		826	87		948	100
IBNG PRESENT JOB											
VERY ADEQUATE	10	4	1	6	2	1	246	94	27	262	28
ADEQUATE	16	4	2	12	3	1	332	92	36	360	39
LITTLE VALUE	13	10	1	12	9	1	104	81	11	129	14
NO VALUE	30	17	3	18	10	2	125	72	14	173	19
	69	7		48	5		807	87		924	100
IBNG EIBSI JOB											
VERY ADEQUATE	7	3	1	5	2	1	256	96	33	[illegible]	35
ADEQUATE	16	5	2	15	5	2	268	90	35	[illegible]	39
LITTLE VALUE	7	8	1	15	17	2	64	74	8	86	11
NO VALUE	26	21	3	11	9	1	84	69	11	121	16
	56	7		46	6		672	87		774	100

Figure 5.3.1 Student Followup - REPORT ONE

Figure 5.3.2 Student Followup - REPORT TWO

DISTRICT: AREA SCHOOL

DEPARTMENT OF PUBLIC INSTRUCTION
CAREER EDUCATION DIVISION
CENIS 3 YEAR FOLLOW-UP

DATE: 23 JUL 74

PAGE 1

COMPLT'N CODE:	<50	R%	T%	>50	R%	T%	100	R%	T%	TOT	T%
JOB DEFERS											
NONE	0	0	0	9	17	4	44	83	19	53	23
ONE	0	0	0	7	7	3	90	93	38	97	41
TWO OR THREE	1	2	0	2	3	1	62	95	26	65	28
FOUR OR MORE	1	5	0	0	0	0	18	95	8	19	8
	2	1		18	8		214	91		234	100
DID NOT SEEK EMP											
EMPLOYMENT OTHER	2	3	1	9	13	5	57	84	33	68	40
ENTER SCHOOL	2	4	1	7	15	4	37	80	22	46	27
HOUSEWIFE	1	7	1	1	7	1	12	86	7	14	8
HANDICAP	0	0	0	0	0	0	0	0	0	0	0
NOT INTERESTED	0	0	0	1	33	1	2	67	1	3	2
MILITARY	1	4	1	3	12	2	22	85	13	26	15
PART-TIME	1	33	1	0	0	0	2	67	1	3	2
OTHER	0	0	0	1	8	1	11	92	6	12	7
	7	4		22	13		143	83		172	100
MILITARY											
YES	2	2	1	9	10	2	81	88	20	92	23
NO	5	2	1	26	9	7	273	90	69	304	77
	7	2		35	9		354	89		396	100
ADDITIONAL EDUC											
YES	4	2	1	17	10	4	155	88	39	176	44
NO	4	2	1	23	10	6	198	88	49	225	56
	8	2		40	10		353	88		401	100
PURPOSE OF EDUC											
PERSNL GRWTH (N)	4	3	2	14	9	8	133	88	76	151	86
(YES)	0	0	0	1	5	1	20	95	11	21	12
ASST ON JOB (N)	3	2	2	10	8	6	117	90	65	130	74
(YES)	1	2	1	5	12	3	36	86	20	42	24
PREP OTHR JOB(N)	3	2	2	11	8	6	116	89	66	130	74
(YES)	1	2	1	4	10	2	37	88	21	42	24
COLLEGE DEGR (N)	2	2	1	6	10	5	74	88	42	84	48
(YES)	2	2	1	7	8	4	79	90	45	88	50
EMPLOYMENT STATUS											
FULL-TIME	4	2	1	20	8	5	240	91	57	264	63
PART-TIME	2	8	0	0	0	0	22	92	5	24	6
UNEMP. LOOKING	0	0	0	3	21	1	11	79	3	14	3
UNEMP. NOT LOOKG	0	0	0	7	15	2	40	85	10	47	11
MILITARY	1	3	0	6	18	1	26	79	6	33	8
FULL-TIME STUDNT	1	3	0	5	13	1	32	84	8	38	9
	8	2		41	10		371	88		420	100
PRESENT JOB											
ACTUAL/REL FIELD	3	1	1	10	4	3	213	94	57	226	61
NON-RELATED FLD	2	1	1	20	14	5	124	85	33	146	39
	5	1		30	8		337	91		372	100
PRESENT LOCATION											
IN DISTRICT	5	2	1	27	8	7	291	90	78	323	87
OUT DISTRICT	0	0	0	0	0	0	17	100	5	17	5
OUT STATE	0	0	0	3	9	1	29	91	8	32	9
	5	1		30	8		337	91		372	100
# FULL-TIME JOBS											
NONE	2	4	0	6	11	1	49	86	12	57	14
ONE	0	0	0	10	6	2	146	94	35	156	38

COMPLT'N CODE:	<50	R%	T%	>50	R%	T%	100	R%	T%	TOT	T%
TWO	1	1	0	7	6	2	104	93	25	112	27
THREE	2	4	0	9	18	2	38	78	9	49	12
FOUR OR MORE	2	5	0	6	16	1	30	79	7	38	9
	7	2		38	9		367	89		412	100
FIRST JOB											
ACTUAL/REL FIELD	2	2	1	11	9	5	113	90	53	126	59
NON-RELATED FLD	3	3	1	14	16	7	70	80	33	87	41
	5	2		25	12		183	86		213	100
FIRST LOCATION											
IN DISTRICT	5	2	2	23	11	11	172	86	81	200	94
OUT DISTRICT	0	0	0	0	0	0	4	100	2	4	2
OUT STATE	0	0	0	2	22	1	7	78	3	9	4
	5	2		25	12		183	86		213	100
PRESENT WAGES											
50- 75	1	2	0	3	7	1	40	91	13	44	14
76-100	0	0	0	4	5	1	81	95	27	85	28
101-125	1	1	0	6	9	2	62	90	20	69	23
126-150	2	4	1	5	10	2	42	86	14	49	16
151-200	1	3	0	2	5	1	36	92	12	39	13
201-	0	0	0	3	16	1	16	84	5	19	6
	5	2		23	8		277	91		305	100
FIRST WAGES											
50- 75	1	1	0	6	8	3	72	91	31	79	34
76-100	1	1	0	6	7	3	79	92	34	86	37
101-125	1	3	0	2	6	1	33	92	14	36	16
126-150	1	5	0	1	5	0	18	90	8	20	9
151-200	0	0	0	0	0	0	6	100	3	6	3
201-	0	0	0	2	50	1	2	50	1	4	2
	4	2		17	7		210	91		231	100
TRNG SATISFACT											
VERY SATISFACTOR	3	2	1	13	7	3	172	91	41	188	45
SATISFACTORY	5	3	1	20	10	5	171	87	41	196	47
UNSATISFACTORY	0	0	0	4	24	1	13	76	3	17	4
VERY UNSATISFACT	0	0	0	1	6	0	15	94	4	16	4
	8	2		38	9		371	89		417	100
TRNG IMPORTANCE											
REQUIREMENT	1	1	0	6	8	2	70	91	19	77	20
FACTOR	2	1	1	11	7	3	145	92	38	158	42
NO VALUE	3	2	1	16	11	4	124	87	33	143	38
	6	2		33	9		339	90		378	100
TRNG PRESENT JOB											
VERY ADEQUATE	1	1	0	4	4	1	85	94	24	90	25
ADEQUATE	2	2	1	6	5	2	115	93	32	123	34
LITTLE VALUE	1	2	0	11	17	3	54	82	15	66	18
NO VALUE	0	0	0	10	12	3	72	88	20	82	23
	4	1		31	9		326	90		361	100
TRNG FIRST JOB											
VERY ADEQUATE	0	0	0	4	4	1	87	96	28	91	30
ADEQUATE	4	4	1	9	9	3	88	87	29	101	33
LITTLE VALUE	1	2	0	11	21	4	40	77	13	52	17
NO VALUE	0	0	0	7	11	2	57	89	19	64	21
	5	2		31	10		272	88		308	100

5.4 Use of Computer Software in Report Generation

The use of prepared computer software, for report generation in this case, is very simple. The five possible operand names are given in Table 5.2.1. The only restrictions in usage are that the DATA FILE and LABEL FILE operands must precede any request for reports or creation of the INTERFACE FILE. A complete user specification which will produce all component reports and files is as follows:

```
STUDENT FOLLOWUP

                    EXECUTE  DATA FILE
                    EXECUTE  LABEL FILE
                    EXECUTE  REPORT ONE
                    EXECUTE  REPORT TWO
                    EXECUTE  INTERFACE FILE
```

CHAPTER 6

CENIS INTERFACE COMPONENT

6.1 Interface - Data Collection and Entry

The Interface component of CENIS is designed to provide an integrated summary and reporting of individual component data along with certain other data which are available from outside sources. The interface reports provide insight into the educational products and job market demand interaction which has never before been available.

In addition to the three interface oriented datasets derived from analyses in other CENIS components, three additional datasets must be made available for the interface analysis. These datasets are:

1) Private school data
2) MDTA data
3) CE-4 data

Specifics of these datasets will be described later in this chapter. At this time it is sufficient to say that all of these datasets are available, in printed form or on computer magnetic tape, from state organizations and are easily obtained with the help of the Department of Public Instruction.

Operations in the Interface component are divided into two major operations which are carried out sequentially. These tasks are:

1) Use all previously derived datasets and produce a single master dataset, containing appropriate elements from these datasets, to be used in generating reports.
2) Execute report generation programs to produce desired component reports.

The CENIS computer software does, of course, make this process almost automatic, however, the idea of two major operations facilitates

understanding of the descriptions contained in the remaining sections of this chapter.

6.2 Interface Component Data Analysis and Report Generation Software

6.2.1 Component Programs

There are eight component programs which perform data handling and report generation functions. These programs are each referenced using a different operand name in the user control language, program name in the programming language, and program number by the supervisor. Table 6.2.1 gives the proper correspondence between names and numbers.

Table 6.2.1 Interface Component Programs

Operand Name	Program Name	Program Number
TAXONOMY CONVERSIONS	CDTODK	11
CAREER EDUCATION FILE	INCEFL	12
MDTA FILE	CDTODK	13
PRIVATE SCHOOL FILE	CDTODK	14
INTERFACE FILE	INDFL	15
LABEL FILE	CDTODK	16
REPORT ONE	IN1RP	17
REPORT TWO	IN2RP	18
REPORT THREE	IN3RP	19
REPORT FOUR	IN4RP	1A
- - - - - - - -	SORT	- - -

Several of the programs listed in Table 6.2.1 are designed solely for the purpose of assisting in the first major operation, namely that of creating a master data dataset. Figures 6.2.1 - 6.2.7 illustrate the use of all component programs. Among these figures, the first five illustrate the operations involved in creation of the master data file. Figure 6.2.6 also illustrates the creation of a file, but this is a secondary file of report annotative labels. Finally, Figure 6.2.7 depicts the generation of reports, using Report ONE for example. All of the other three report generation programs function in the same way. We will now describe the various operations shown in the figures, and describe the contents of the files in the next section.

6.2.1.1 Taxonomy Conversion

The operation depicted in Figure 6.2.1 uses the system utility program to transfer card images to disk. The card input file contains taxonomy conversion specifications. The need for such conversion arises due to the fact that some differences in definition and interpretation of the taxonomical job classification system result in different taxonomy numbers being used for the same job between the CE-4 data and the remainder of the CENIS data. Thus, some CE-4 data taxonomy numbers must be changed to be compatible with other datasets. The disk file created by CDTODK will subsequently be used in making such conversion. If no conversions need to be made this step can be bypassed. Note that the card input comes from the file having DD name CD53F001, and the dataset INCONV is stored on the file having DD name FT07F001.

6.2.1.2 Career Education (CE4.DATA) Data Reduction

The CE-4 data contain the number of persons graduating from career education programs in state schools. This includes secondary schools, county schools, and area community colleges. The data are given by taxonomy number within school, however, as was mentioned previously, some of the taxonomy numbers obtained from this source need to be translated into other numbers to achieve compatibility across datasets.

The first portion of the INCEFL program depicted in Figure 6.2.2 inputs CE-4 data, translates taxonomy numbers as required, and creates a scratch dataset on file 9. This scratch file contains records whose contents are:

1) Merged area number
2) Taxonomy number
3) Graduates in career education program, for the given school within the area for that taxonomy.

Some conversion from CE-4 data must be made because school district and county numbers, rather than merged area numbers, are present in the data. Conversion to merged area number must be made. County school data have a zero school district number and a nonzero county number in the CE-4 file. Area community colleges have a four digit district number beginning with the digits 99 and followed by the district number. All district schools have the correct district and county number.

Once file 9 is initialized, the data are sorted by merged area within taxonomy and the sorted data are placed on file 10. Then the file 10 is read and total number of graduates for each area within taxonomy are

placed on file 11. The resultant dataset is named INCEFL.

6.2.1.3 MDTA Data Reduction

Numbers of graduates trained in relevant occupations by educational institutions, which are not classified as public or private schools, are provided in this dataset called MDTA. These data are reported on a state-wide basis for each taxonomy hence they cannot be suballocated to merged area.

The dataset named INMDFL is stored on file 12 by the CDTODK program. Individual records in the data file contain only taxonomy number and number of graduates within that taxonomy. It is assumed that the MDTA data cards are sorted in increasing order of taxonomy prior to presentation for input.

6.2.1.4 Private School Data Reduction

Numbers of graduates in relevant vocational programs, from private schools, are made available in hard copy form. These data are totaled by taxonomy within area by hand calculation. This is no problem since there are very few data. The tabulations are punched on cards, sorted by area within taxonomy, and this deck is entered via file CD55 to program CDTODK. The program creates the dataset INPSFL and stores it on file 13. Figure 6.2.4 depicts this operation.

6.2.1.5 Interface Master Dataset Creation

Execution of the program INDFL, which creates the master interface dataset, can only occur after the datasets named INPSFL, INMDFL, INCEFL,

LDINFL, SFINFL, and SIINFL have been created. The main function of this program is to retrieve data from each of these datasets and create one output record for each area within each taxonomy. These records are output on file 14. The resultant dataset is named INDFL. This dataset is subsequently used as a basis for all report generation operations. Figure 6.2.5 depicts the use of program INDFL.

6.2.1.6 Interface Report Label File

The utility program CDTODK is used to transfer a standardized set of cards to disk. These cards contain character data that are used to label items of output on printed interface reports. The card deck containing these labels is supplied with the computer program. Figure 6.2.6 depicts the operation described above.

6.2.1.7 Report Generation Programs

Once the datasets INLFL and INDFL are created and stored on files 15 and 14, respectively, any or all of the four reporting programs can be executed. An example of the required operations is given in Figures 6.2.7, 6.2.8 and 6.2.9.

6.2.2 Component Datasets

As shown in Figures 6.2.1 - 6.2.7, there are several component datasets in the interface component. The characteristics of these datasets, when stored on disk or tape is shown in Table 6.2.2.

Figure 6.2.1 Taxonomy Conversion Dataset Creation

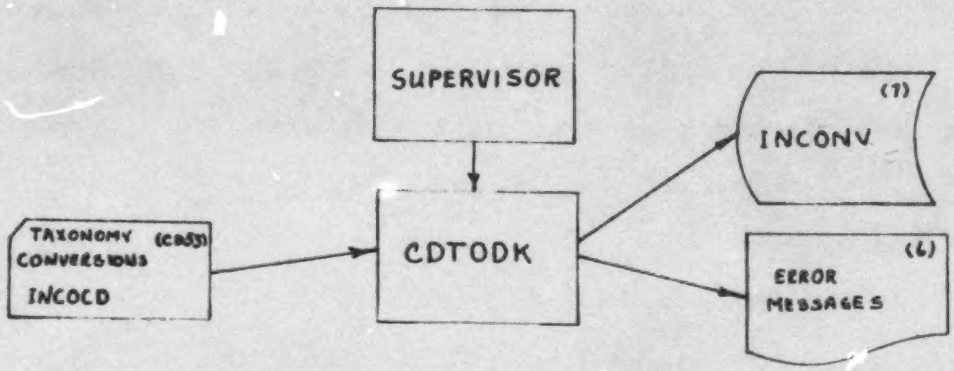


Figure 6.2.2 Career Education Data Reduction

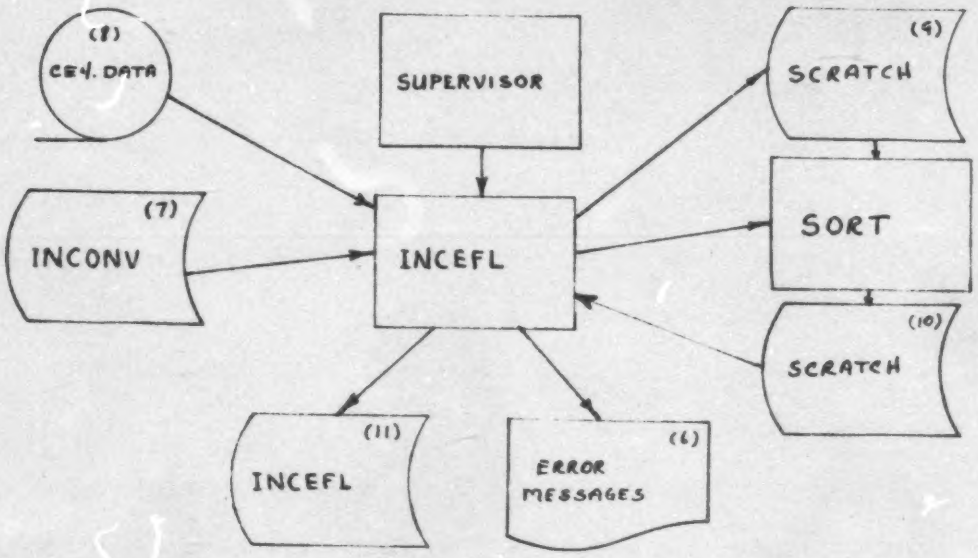


Figure 6.2.3 MDTA Data Reduction

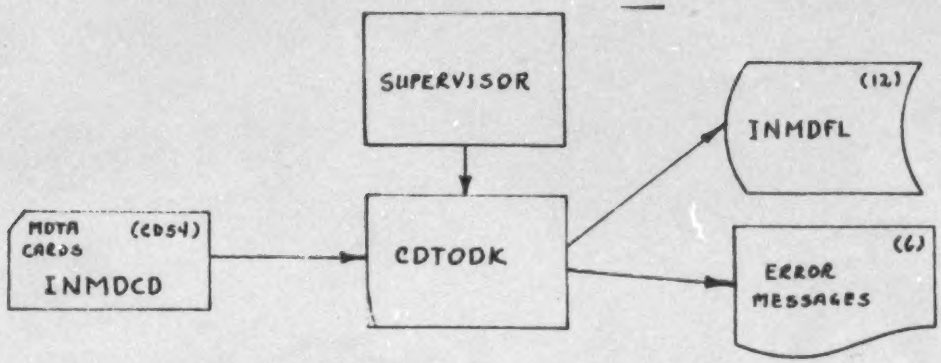


Figure 6.2.4 Private School Data Reduction

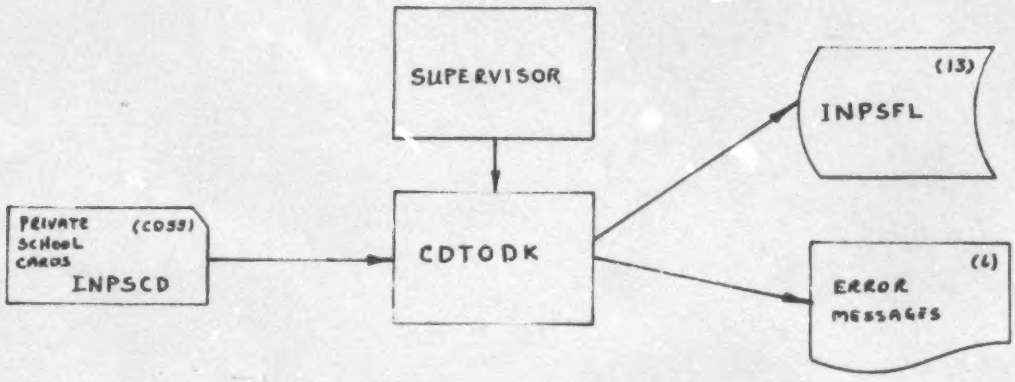


Figure 6.2.5 Creation of Interface Master Dataset

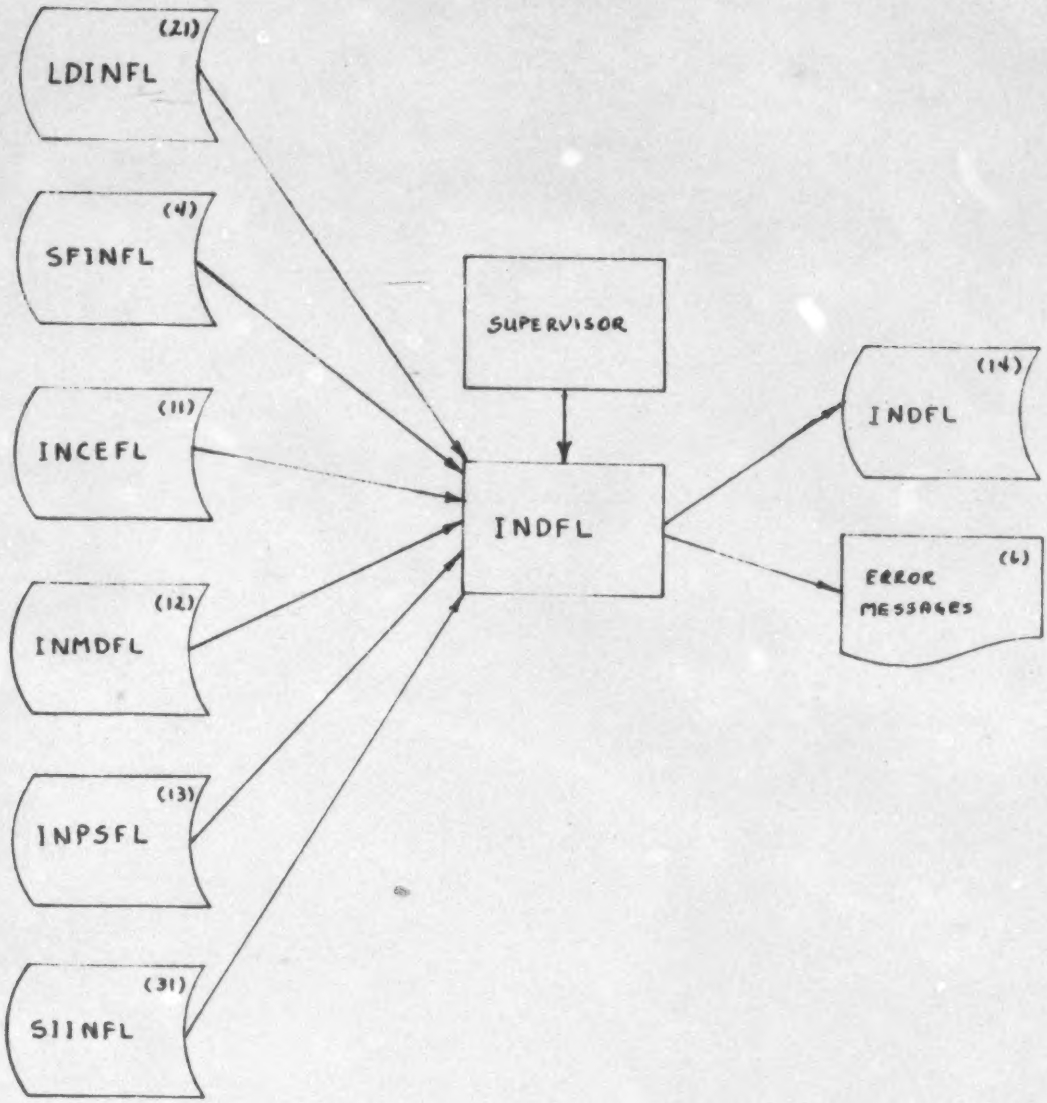


Figure 6.2.6 Creation of Interface Report Label File

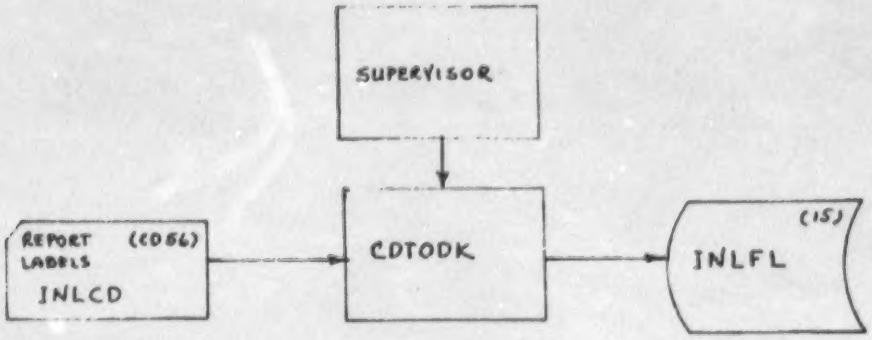


Figure 6.2.7 Executing Reporting Program IN1RP or IN2RP

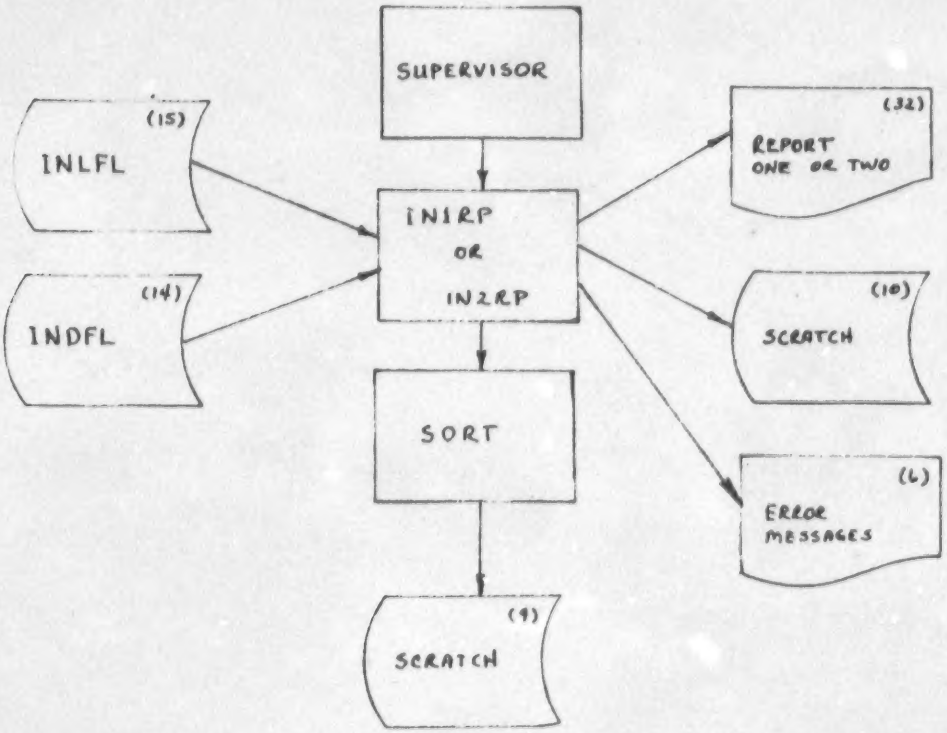


Figure 6.2.8 Reporting Program IN3RP

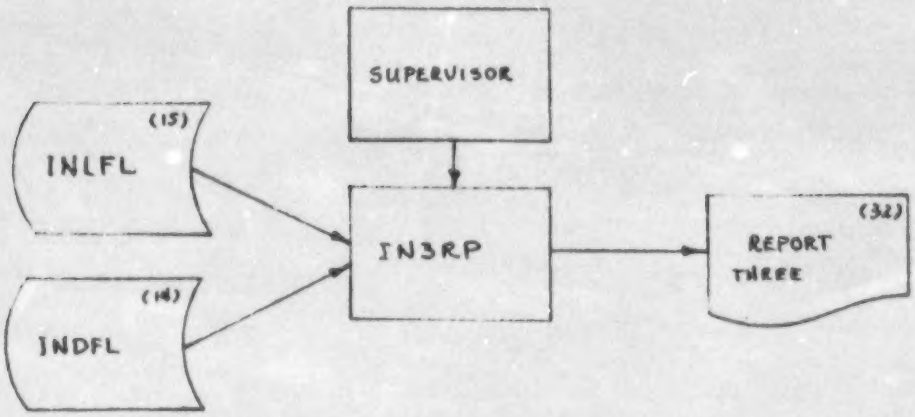


Figure 6.2.9 Reporting Program IN4RP

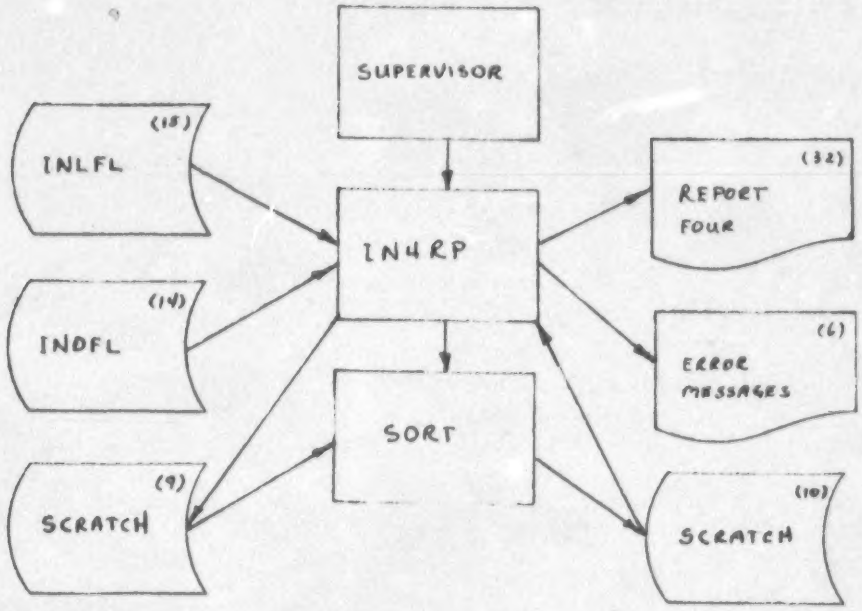


Table 6.2.2 Interface Component File Characteristics

DD Name	DSNAME	RECFM	LRECL	BLKSIZE
FT07F001	INCONV	FB	80	3200
FT08F001	CE4.DATA	FB	80	3200
FT11F001	INCEFL	FB	80	3200
FT12F001	INMDFL	FB	80	3200
FT13F001	INPSFL	FB	80	3200
FT14F001	INDFL	FB	160	3200
FT15F001	INLFL	FB	80	3200
CD53F001	INCOCD	FB	80	
CD54F001	INMDCD	FB	80	
CD55F001	INPSCD	FB	80	
CD56F001	INLCD	FB	80	

The record description of each of these datasets is given in Tables 6.2.3 - 6.2.13. There are some additional considerations, relative to computations leading to elements in some of these files, which will be described in the following subsections.

6.2.2.1 CE4.DATA - File Creation

Career Education data were supplied on a computer magnetic tape (labeled CE-4). The record length of the associated dataset was 868 bytes, hence the tape records contained far more information than was needed in CENIS. The data shown in Table 6.2.4 were read from the CE-4 tape and used to create the CE4.DATA dataset.

Table 6.2.3 INCONV Record Description

Character Position	Item Description
1-8	Current taxonomy number
9-10	Blank
11-15	Correct taxonomy number
16-80	Not used by programs - space can be used for notes by data analyst

Table 6.2.4 CE4.DATA Record Description

Character Position	Item Description
1-14	CE-4 record identifier, not used directly in CENIS
15-16	County number
17-20	District number 0000 - County school XXXX - Public district school 99XX - Area school
21-30	School characteristics, not used directly in CENIS
31-40	Taxonomy number
41-49	Blank
50-53	Total number of male graduates in the case of an area school
54-57	Total number of female graduates in the case of an area school
58-61	Grade 12 male graduates in the case of a secondary school
62-65	Grade 12 female graduates in the case of a secondary school

Table 6.2.5 INCEFL Record Description

Character Position	Item Description
1-2	Blank
3-4	Merged area number
5-10	Taxonomy number
11-15	Number of graduates
16-80	Blank

Table 6.2.6 INMDFL Record Description

Character Position	Item Description
1-2	Blank
3-9	Taxonomy number
10-11	Blank
12-14	Number of graduates
15-80	Blank

Table 6.2.7 INPSFL Record Description

Character Position	Item Description
1-2	Merged area number
3	Blank
4-10	Taxonomy number
11	Blank
12-16	Private school completions
	Blank

Table 6.2.8 INDFL Record Description

Character Position	Item Description
1-28	Taxonomy number and title, from Labor Demand component
29-30	Merged area number, from Labor Demand component
31-35	Current employment from Labor Demand component
36-40	1975 Total Need (Labor Demand) from Labor Demand component
41-45	CE-4 total enrollment multiplied by Followup percentage
46-50	1975 In-Plant Training from Labor Demand component
51-55	Supply from MDTA programs multiplied by Followup percentage
56-60	Supply from private schools multiplied by Followup percentage
61-65	Total Supply = sum of the preceding four fields
66-70	Net Demand = 1975 Total Need - Total Supply
71-75	Primary interest number, from Student Interest component
76-80	Number available for work, from Student Followup component

Character Position	Item Description
81-85	Number completing, from Student Followup component
86-90	Percent completing, from Student Followup component
91-95	Completers employed in occupationally trained or related area, from Student Followup component
96-100	Percent of completers employed in occupationally trained or related area, from Student Followup component
101-105	Available for work in occupationally trained or related area, from Student Followup component
106-110	Followup percentage, from Student Followup component
111-115	Employed in nonrelated area, from Student Followup component
116-120	Percent employed in nonrelated area, from Student Followup component
121-125	Number in full-time higher education, from Student Followup component
126-130	Percent in full-time higher education, from Student Followup component
131-135	Total terminations, from Student Followup component
136-160	Padding

Table 6.2.9 INLFL Record Description

Character Position	Item Description
1-80	Character data

Table 6.2.10 INCOCD Record Description

Card Column	Item Description
1-8	Current Career Education Taxonomy number
9-10	Blank
11-15	Correct Taxonomy number
16-80	Blank

Table 6.2.11 INMDCD Record Description

Card Column	Item Description
1-2	Blank
3-9	Taxonomy number
10-11	Blank
12-14	MDTA supply figure
15-80	Blank

Table 6.2.12 INPSCD Record Description

Card Column	Item Description
1-2	Merged area number
3	Blank
4-10	Taxonomy number
11	Blank
12-16	Private school completions
17-80	Blank

Table 6.2.13 INLCD Record Description

Card Column	Item Description
1-80	Character data

6.2.2.2 INDFL - File Creation

In creating INDFL, records are first read from the LDINFL dataset. One record for each of the fifteen merged areas, within a given Taxonomy, is read. Then all of the other five files are searched for the corresponding taxonomy. An array is filled which contains data for all fifteen areas. There are, of course, twenty-one data items for each area within the given taxonomy. Once this array is filled, one record is output on INDFL for each merged area. This process is repeated for each taxonomy in the LDINFL file.

6.3 Interface Component Reports

There are four reports produced by this component. All reports are generated using the dataset INDFL as the source of numeric data. The twenty columns of data in each of these reports contain taxonomy totals, and subtotals over taxonomies, for fields 3-22 of the INDFL record (see Table 6.2.8). Breakdown of data, for the four reports, is given below.

Report ONE - is a report broken down by taxonomy within area. Subtotals are printed for each two digit taxonomy prefix, and for each area. State totals are also computed and output. Figure 6.3.1 is a representative page from this report.

Report TWO - this report features a sorting, within area, of the lines in Report ONE according to Net Demand. Thus taxonomy numbers are almost surely out of order in this report, and taxonomy subtotals are not generated. However, area and state totals are printed. Figure 6.3.2 is a page from this report type.

Report THREE - is a report featuring a subtotaling only on taxonomy. Merged areas are not considered. Subtotals for each two-digit taxonomy prefix are produced, as well as totals for the state.

Report FOUR - is a listing of Report THREE after the lines are sorted in descending order of Net Demand. Figure 6.3.3 is representative of this report type.

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AREA 11 TOTALS

TAXONOMY	LABOR SUPPLY: CURRENT EMPLYMT	LABOR SUPPLY: DEMAND	CAREER EDUCATION NEEDS: INVENTORY & BUILDING	CAREER EDUCATION NEEDS: MIDDLE GROUND	CAREER EDUCATION NEEDS: PRIORITIES	CAREER EDUCATION NEEDS: SCHOOL OPTIONS	CAREER EDUCATION NEEDS: TOTAL	CAREER EDUCATION NEEDS: NEED TO DO	STUD. INTERESTS: PRIMARY INTERESTS	STUD. INTERESTS: AVAILABLE	STUDENT OUTCOMES: COMPLETING: FOR WORK	STUDENT OUTCOMES: COMPLETING: NUMBER	STUDENT OUTCOMES: COMPLETING: PERCENT	STUDENT OUTCOMES: EMPL. IN OCCUP. TRAINED FOR: NO.	STUDENT OUTCOMES: EMPL. IN OCCUP. TRAINED FOR: %	STUDENT OUTCOMES: EMPL. IN REL. AREA: NO.	STUDENT OUTCOMES: EMPL. IN REL. AREA: %	STUDENT OUTCOMES: UNREL OCC: NO.	STUDENT OUTCOMES: UNREL OCC: %	STUDENT OUTCOMES: HIGHER EDUC.: NO.	STUDENT OUTCOMES: HIGHER EDUC.: %
09.0202 TITLE CLOTH. MGT., PROD.,	62	15	7	0	0	7	8	8	8	13	100	5	38	5	63	1	13	5	38
09.0203 TITLE FOOD MGT., PROD.,	217	31	0	0	0	0	31	45	0	0	0	0	0	0	0	0	0	0	0
09.0204 TITLE HOME FURNISH.,	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
09.0205 TITLE INST. & HOME MGT. &	10	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0
TAX 9 SUBTOTALS	729	337	181	0	0	181	156	269	45	48	1	19	40	19	42	9	20	7	0
14.0101 TITLE ACCOUNTANTS	462	86	16	0	47	63	23	130	33	8	21	7	88	12	36	11	33	6	15
14.0102 TITLE BOOKKEEPERS	1217	159	56	0	0	56	103	258	33	22	65	20	91	21	64	1	3	1	3
14.0103 TITLE CASHIERS	416	91	0	0	0	0	91	45	1	1	100	1	100	1	100	0	0	0	0
14.0104 TITLE MACH. OPER: BILLING,	165	38	0	0	0	0	38	57	0	0	0	0	0	0	0	0	0	0	0
14.0201 TITLE COMPUTER AND CONSOLE	509	109	11	0	0	11	98	0	29	23	79	12	52	12	41	7	24	0	0
14.0202 TITLE PERIPHERAL EQUIPMENT	524	75	0	0	0	0	75	84	0	0	0	0	0	0	0	0	0	0	0
14.0203 TITLE PROGRAMMERS	449	60	45	0	12	57	3	196	78	30	33	20	67	26	33	22	28	12	13
14.0204 TITLE SYSTEMS ANALYSTS	204	24	0	0	0	0	24	39	0	0	0	0	0	0	0	0	0	0	0
14.0301 TITLE DUPLICATING MACH.	113	16	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
14.0302 TITLE FILE CLERKS	601	148	0	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0	0

Figure 6.3.1 Interface Component - REPORT ONE

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AREA 11 TOTALS

TAXONOMY	CURRENT EMPLYMT	LABOR DEMAND	LABOR SUPPLY: CAREER EDUC.	LABOR SUPPLY: PIVOTAL INTERVENTION & BUNSING	LABOR SUPPLY: MDTA	LABOR SUPPLY: PRIVATE SCHOOLS	LABOR SUPPLY: TOTAL SUPPLY	LABOR SUPPLY: NEED MAN	STUD. INT-EREST: PRIMARY	STUDENT OUTCOMES: COMPLETING: AVAILABLE	COMPLETING: FOR WORK	COMPLETING: NUMBER	COMPLETING: PERCENT	EMPL. IN OCCUP. OR REL. AREA: COMPLETERS	EMPL. IN OCCUP. OR REL. AREA: %	EMPL. IN OCCUP. OR REL. AREA: AVAILABLE NO.	EMPL. IN OCCUP. OR REL. AREA: FOR WORK	EMPL. IN OCCUP. OR REL. AREA: NUMBER	EMPL. IN OCCUP. OR REL. AREA: %	UNREL EMPL. IN OCC: NUMBER	UNREL EMPL. IN OCC: PERCENT	HIGHER EDUC.: NUMBER	HIGHER EDUC.: PERCENT
17.1902 TITLE PRINTING PRESS	334	90	0	0		0	0	90	18	0	1	100	0	0	0	0	0	0	1	100
14.0503 TITLE SHIP. & RECEIVING	497	85	0	0		0	0	85	5	0	0	0	0	0	0	0	0	0	0	0
17.1007 TITLE PLUMBING &	176	80	0	0		0	0	80	63	2	4	100	2	50	2	100	0	0	0	0
04.0600 TITLE FOOD DISTRIBUTION	613	78	0	0		0	0	78	92	31	48	94	18	38	20	65	2	6	18	35
17.2901 TITLE BAKER	299	76	0	0		0	0	76	0	0	0	0	0	0	0	0	0	0	0	0
01.0202 TITLE FEEDS	325	75	0	0		0	0	75	5	24	19	70	17	89	20	83	2	8	1	4
04.0200 TITLE APPAREL AND ACCESS.	201	75	0	0		0	0	75	150	36	56	93	18	32	19	53	9	25	23	38
14.0202 TITLE PERIPHERAL EQUIPMENT	524	75	0	0		0	0	75	84	0	0	0	0	0	0	0	0	0	0	0
01.0504 TITLE LANDSCAPING	3	72	0	0		0	0	72	46	0	0	0	0	0	0	0	0	0	0	0
17.3601 TITLE MILLWORK & CABINET	89	84	12	0		0	12	72	23	15	21	91	11	52	12	80	2	13	6	26
14.0399 TITLE FILING, OFF. MACH. &	302	71	0	0		0	0	71	0	0	0	0	0	0	0	0	0	0	0	0
17.1008 TITLE DRY-WALL	66	71	0	0		0	0	71	0	1	1	100	1	100	1	100	0	0	0	0
14.0400 TITLE RECEPTIONISTS & IN-	328	69	0	0		0	0	69	193	0	0	0	0	0	0	0	0	0	0	0
16.0111 TITLE INDUSTRIAL TECH.	528	63	0	0		0	0	63	9	0	0	0	0	0	0	0	0	0	0	0
04.0300 TITLE AUTOMOTIVE	341	51	0	0		0	0	51	31	16	17	85	8	47	8	50	7	44	0	0

Figure 6.3.2 Interface Component - REPORT TWO

Figure 6.3.3 Interface Component - REPORT THREE

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STATE TOTALS

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TAXONOMY	CURRENT EMPLYMT	LABOR DEMAND	LABOR SUPPLY: CAREER EDUC.	LABOR SUPPLY: PVT BUS & IND TNG	LABOR SUPPLY: MDTA	LABOR SUPPLY: PRIVATE SCHOOLS	LABOR SUPPLY: TOTAL SUPPLY	LABOR SUPPLY: NET DEMAND	STUD. INTEREST: PRIMARY INTERESTS	STUDENT OUTCOMES: AVAIL. FOR WORK	STUDENT OUTCOMES: COMPLETING: NUMBER	STUDENT OUTCOMES: COMPLETING: PERCENT	STUDENT OUTCOMES: EMPL. IN OCCUP. TRD. OR REL. AREA: COMPLETERS NO.	STUDENT OUTCOMES: EMPL. IN OCCUP. TRD. OR REL. AREA: %	STUDENT OUTCOMES: EMPL. IN OCCUP. TRD. OR REL. AREA: AVAIL. FOR WORK NO.	STUDENT OUTCOMES: EMPL. IN OCCUP. TRD. OR REL. AREA: %	STUDENT OUTCOMES: EMPL. IN UNREL OCC: NUMBER	STUDENT OUTCOMES: EMPL. IN UNREL OCC: PERCENT	STUDENT OUTCOMES: HIGHER EDUC.: NUMBER	STUDENT OUTCOMES: HIGHER EDUC.: PERCENT
17.0703 TITLE PRODUCT DESIGN	512	114	0	1	0	0	1	113	70	0	0	0	0	0	0	0	0	0	0	0
14.0399 TITLE FILING, OFF. MACH. &	452	112	0	0	0	0	0	112	0	0	0	0	0	0	0	0	0	0	0	0
17.1005 TITLE PAINTING &	599	110	13	0	0	0	13	97	104	7	11	85	4	36	4	57	1	14	4	31
01.0299 TITLE AGR. SUPPLIES/SVCS.,	183	93	0	0	0	0	0	93	407	1	1	50	0	0	0	0	0	0	1	50
17.2801 TITLE FIREMAN TRAINING	849	93	0	0	0	0	0	93	64	0	0	0	0	0	0	0	0	0	0	0
01.0504 TITLE LANDSCAPING	39	83	0	0	0	0	0	83	134	0	0	0	0	0	0	0	0	0	0	0
14.0401 TITLE COMMUNICATIONS SYS-	914	83	0	0	0	0	0	83	246	0	0	0	0	0	0	0	0	0	0	0
07.0305 TITLE SURGICAL TECH.	309	82	0	0	0	0	0	82	135	0	0	0	0	0	0	0	0	0	0	0
07.0903 TITLE INHALATION THERAPY	204	71	0	0	0	0	0	71	76	0	0	0	0	0	0	0	0	0	0	0
14.0301 TITLE DUPLICATING MACH.	343	69	0	0	0	0	0	69	0	1	1	100	1	100	1	100	0	0	0	0
17.2700 TITLE PLASTICS OCCUPATIONS	544	78	9	0	0	0	9	69	6	2	2	100	2	100	2	100	0	0	0	0
04.0100 TITLE ADVERTISING SERVICES	456	74	6	0	0	0	6	68	647	30	35	95	18	51	19	63	6	20	7	19
04.1000 TITLE HOME FURNISHINGS	470	68	0	0	0	0	0	68	106	9	11	100	3	27	3	33	5	56	2	18
14.0499 TITLE INFORMATION COMMUNI-	600	70	0	3	0	0	3	67	103	0	0	0	0	0	0	0	0	0	0	0
17.0102 TITLE HEATING	306	65	0	0	0	0	0	65	0	0	2	100	0	0	0	0	0	0	2	100

6.4 Use of Computer Software in Report Generation

It is obvious from the program structure of this component that the production of reports will follow a fairly rigid sequence of operations. While there is some opportunity for varying the order of operation, it does not seem to be worthwhile to go into such details. The interested reader can easily deduce such possible variations by looking at the program flow diagrams in section 6.2. In this section, the user language statements, in a proper order, will be given. Used in their entirety they exercise every feature of the component software. Specification is as follows:

```
INTERFACE

                EXECUTE  TAXONOMY CONVERSIONS
                EXECUTE  CAREER EDUCATION FILE
                EXECUTE  MDTA FILE
                EXECUTE  PRIVATE SCHOOL FILE
                EXECUTE  INTERFACE FILE
                EXECUTE  LABEL FILE
                EXECUTE  REPORT ONE
                EXECUTE  REPORT TWO
                EXECUTE  REPORT THREE
                EXECUTE  REPORT FOUR
```